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AND NATURAL HABITATS

Standing Committee

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**GROUP OF EXPERTS ON
INVASIVE ALIEN SPECIES**

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- NATIONAL REPORTS -

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ARMENIA / ARMÉNIE

NATIONAL REPORT OF REPUBLIC OF ARMENIA

Presented report includes information about the invasive species included in the 5th National Report of Republic of Armenia (2015) of the UN Convention of Biodiversity, estimation works of invasive and expansive flora and fauna species spread in Armenia in recent years, the analysis of the impact of alien flora and fauna species on the natural ecosystems of the Republic of Armenia, as well as the information concluded in the work "Invasive and expansive flora species of Armenia" published by the Institute of Botany of NAS at 2014 based on the results of the studies done in the scope of the scientific thematic state projects of the Institute of Botany of NAS in recent years.

Introduction

Distribution of alien invasive plant species is the second main threat to natural ecosystems (after destroying ecosystems) and to biodiversity. Disturbance of natural ecosystems is leads to intensification of distribution of invasive plant species and to change of ecosystems. Global climate change can change natural ecosystems and open eco niches for invasive and expanding plant species as well.

Flora and Vegetation

Flora of Armenia is very rich – about 3800 vascular plants species on the territory less than 30.000 sq. km. The largest families of the flora of Armenia are Asteraceae (442 species), Fabaceae (317), Poaceae (274), Rosaceae (192), Brassicaceae (176), Caryophyllaceae (166), Lamiaceae (142), Scrophulariaceae (144), Apiaceae (124) and Cyperaceae (105). Armenia is the center for many genera, the largest among them are *Astragalus* (119 видов), *Centaurea* s.l. (more than 70), *Allium* (43 species), *Verbascum* (39), *Vicia* (37), *Silene* (36), *Veronica* (35), *Ranunculus* (34), *Pyrus* (32), *Euphorbia* (37) and *Trifolium* (30). The diversity of landscapes and orography is an important determinant of Armenia's diverse vegetation. The lower mountain belt (480–1200 m) is covered by semi-desert (or phryganoid) formations, gypsophilous or halophilous vegetation. There are salt marsh areas as well as the Transcaucasian sand desert. The middle and upper mountain belts (1200–2200 m) are characterized by various kinds of steppe and forest vegetation, meadow-steppes, shrub steppes and thorny cushion (tragacanth) vegetation. The altitudinal span of the forest belt varies from 500 to 1500 (–2000) m depending of the region, and may be approaching to 2400 m when open park-like tree stands are included. The subalpine and alpine belts (2200–4000 m) are covered by meadows and turf.

From the previous list of endemic plants of Armenia (124 species) 9 have been removed as it has been identified that they have wider distribution. At the same time thanks to new taxonomic studies 29 species have been added to the list of endemics (with the majority being new for science) and the others are the species with clarified distribution. Thus, at present the flora of Armenia includes 144 endemic species (3.8% of total flora). In the Red Book of Plants of Armenia 452 species of vascular plants (11,89% of the flora of Armenia) and 40 species of fungi (1,05% of the biota of Armenia) are registered.

The plants belong to the following categories:

- Critically Endangered (CR) - 141 species
- Endangered (EN) - 248 species
- Vulnerable (VU) - 64 species

Fauna

According to the recent data in the fauna of Armenia the vertebrates are represented by 549 species, including 93 mammals (instead of previously mentioned 83), 357 birds (instead of previously mentioned 353), 53 reptiles, 7 amphibians and 39 fish species. In Armenia the smallest terrestrial mammal Etruscan

shrew (*Suncus etruscus*) has been identified. The insects (Insecta) make 90% of invertebrates. The fauna of Armenia is notable for high endemism (about 500 species making about 3% of the fauna).

In recent years a lot of work has been implemented to identify and assess the risk of extinction of the rare and vulnerable animals with analysis and overview of existing data, implementation of new studies and assessment of conservation status of the threatened species according to IUCN criteria. In the result the Red Book of Animals of Armenia has been prepared and published, which includes 308 species: 155 vertebrates and 153 invertebrates.

Impact of alien species

The analysis of dissemination of the most dangerous invasive and expansive plant species of Armenia shows that in recent years some of them have considerably widened the limits of their distribution (probably connected with the change of climatic conditions and expansion of degraded habitats). The density of their populations has increased with their penetration and establishment in natural ecosystems.

The studies on distribution of invasive species are not sufficient. The works on observation of distribution of the aggressive species such as *Ambrosia artemisiifolia*, *Silybum marianum*, *Ailanthus altissima* and *Robinia pseudoacacia* have started only in recent years. Intensive dissemination of the mentioned species has been observed, however no measures on control are implemented. The legislation on introduction of alien species is not regulated. For the species of agricultural significance the permits are issued by the RA Ministry of Agriculture without assessing the risks of biological invasions.



Pic 1. Ambrosia artemisiifolia, nearby Dzoraget train station



Pic 2 Silybum marianum, in southern Armenia



Pic.3 Ailanthus altissima, in southern Armenia



Pic.4 Robinia pseudoacacia, in southern Armenia



Pic.5 *Astragalus galegiformis*,
in northern Armenia



Pic.6 *Clematis orientalis*, in the River Arpa gorge



Pic 7: *Coniza Canadensis* in southern Armenia

Over the recent years a general assessment of distribution of invasive and expansive species has been done. In the result, 77 alien invasive and locally expansive species have been listed, which at present are distributing in degraded habitats and have already penetrated natural ecosystems with causing threats to wild biodiversity. Among them the species of great concern include *Achillea filipendulina*, *Ailanthus altissima*, *Anthemis cotula*, *Anthemis triumfettii*, *Astragalus galegiformis*, *Centaurea solstitialis*, *Leucanthemum vulgare*, *Onopordum armenum*, *Silybum marianum*, *Tanacetum parthenium*, *Tripleurospermum transcaucasicum*, *Acer negundo*, *Alliaria petiolata*, *Carthamus turkestanicus*, *Centaurea iberica*, *Chondrilla juncea*, *Cirsium incanum*, *Clematis orientalis*, *Conyza canadensis*, *Goebelia alopecuroides*, *Heracleum sosnowskyi*, *Onopordum acanthium*, *Verbascum laxum* and others. Besides, the modern world practice of invasive species management has been analyzed and more than 300 species occurring in Armenia have been defined (introduced and native), which in future can be dangerous as invasive species.

Development of international trade results in increase of the number of introduced species. Over the recent years in many farms of the country significant damage has been caused by *Hyphantria cunea* and *Phthorimaea oherculella*. The damage from the latter first was observed in 2012 in the Ararat valley. As no respective measures were implemented, it quickly disseminated to more than 45 communities in Ararat and Armavir Regions of Armenia. As besides the agricultural crops some 55 other *Solanaceae* species including weeds are also damaged, the insect has already disseminated in natural ecosystems.

A new species of parasite of cattles - the infusorium *Buxtonella sulcata* was identified in 2014. The impact of the beetle *Trichoferus campestris* on wild tree and bush vegetation has not been assessed. The species probably has been introduced with timber and in the 1990ies were registered in cities (Yerevan,

Gyumri). In recent years it has been found in the vicinities of Hrazdan, Kapan and Armavir. The impact of these species on biocenoses and their components still is not well studied and estimated.

Over the recent years the increase of water level of Lake Sevan has been gradually resulting in changes of limnosystem, especially in the lake littoral zone. The mentioned changes create favorable conditions for adaptation of new species of animals. In the lake a rather dangerous process for the lake ecosystem and its biodiversity has been observed, which is a trend of introduction of the alien species not typical for the given ecosystem, in particular of fish species. Thus, for example, in recent years in Lake Sevan and some tributaries the low-value and commercially not important fish species Armenian riffle minnow (*Alburnoides bipunctatus armeniensis*) and Topmouth gudgeon (*Pseudorasbora parva*) have been identified. These species are quickly disseminating in the lake and can have a negative impact on the valuable and endemic ichthyofauna of the lake (white-fish, ishkan, khramulya, barbel) as they compete for food with the young fish of the lake native species.

In Lake Sevan the cases of fishing of rainbow trout (*Parasalmo mykiss*) have been registered. The species most probably has penetrated into the lake from the fish farms located in the Sevan basin and it is of danger for the lake biodiversity as this predator species can feed on young fish of the native fish species.

The alien species, which have penetrated into the lake include also goldfish (*Carassius auratus*) and common carp (*Cyprinus carpio*). The alien crawfish (*Pontastacus leptodactylus*) appeared in the lake in the end of 1980ies in the result of an accidental introduction. It does not threaten the fish species occurring in the lake.

The control of the introduced low-value species is a rather difficult task given the huge size of the lake and small sizes of the mentioned fish species. Therefore, in order to prevent introduction of new species it is necessary to strengthen control in the lake and rivers, to raise the awareness of the lake basin population on the harmful consequences of such introductions as well as to prohibit artificial breeding of fish species not typical for the lake in the basin of Lake Sevan.

2 Invasive and expanding plant species of Armenia

The forecast of change of the spread of invasive and expansive plant species

Degradation and transformation of the natural ecosystems due to the human activities are the most serious threat to the biodiversity of the Earth. The expansion of invasive species is considered to be the second most significant threat to the biodiversity; and in many cases it is linked to the first one. Disturbance of the natural ecosystems triggers intensification of the expansion of invasive species which as a result leads to the full change of those ecosystems.

All ecosystems of Armenia have been under anthropogenic influence for millennia, but in earlier times low human population and traditional regulated use of natural resources maintained the balance of ecosystems. Over the last 1000 years human impact on the land increased, mainly through deforestation and increased grazing pressure. The problems intensified since 1920 over recent years due to unprecedented population growth and urbanisation. The main consequence was loss of natural woodlands, grasslands and wetlands due to agriculture and overgrazing, urbanisation and road building, drainage and flooding, and afforestation. During last years (since 1992) the economic and energy crisis mainly endangered Armenia's forests. Poor forest management combined with illegal wood cutting for fuel and construction has damaged about 10 % of the total forest area. At the same time, overgrazing has destroyed the grasslands surrounding the villages and degraded the formerly unspoilt pastures of remote mountains.

Unfortunately, negative influence on the natural ecosystems continues to be the case nowadays. If at least some semblance of the order exists in Armenia in the forestry sector, the development of the mineral resource industry related to the open-cast mines of the natural mineral resources, infrastructure development and building of enormous number of accessory communications leads to degradation and full destroying of the natural ecosystems.

The Global climate change has its effect on occurring processes and also facilitates expansion of invasive and expansive species changing existing ecosystems and creating new ecological niches which are becoming easily occupied by the species with the large ecological amplitude. Meantime the threat for many plant species is the climate change itself – changed conditions will not allow them to find appropriate niches and will lead to their total disappearance. The new edition of the Red Book of Armenia (2010) includes 452 species of plants, which are under the threat due to the various reasons. For approximately one third of them climate change is the threat for their existence.

Regarding invasive and expansive species having large ecological amplitude and easily adjusting to the new conditions, climate change along with the change of the will enlarge the possible area of distribution for many thermophilic invasive and expansive plant species, which grow at present on restricted territory of the lower mountain belt. Current preliminary list of invasive and expansive species involves around 100 taxa (Fayvush, 2008; Tamanyan, 2008). Using the software DIVA-GIS, we simulated possible changes in areas of distribution of some plant species according to different scenarios of climate change. These data are provided in the next chapter.

Alarming invasive alien and aborigine expanding plant species of Armenia

According our data 78 plant species are the most alarming because they can threat natural ecosystems and biodiversity of the Republic.

On the basis of risk assessment these species were distributed on 5 categories.

Category 5 – Invasive or expansive species, very widely distributed in and destroying of natural ecosystems (in Armenia not registered yet).

Category 4 - Invasive or expansive species intensively penetrating into natural ecosystems.

Category 3 - Invasive or expansive species widely distributing in disturbed habitats, and rare penetrating into natural ecosystems.

Category 2 - Invasive or expansive species distributed in disturbed habitats, but not registered (or growing there solely) in natural ecosystems yet.

Category 1 – Invasive species have great invasive potential (known as invasive species in other countries), growing on disturbed habitats or in artificial plantations, but not threat natural ecosystems of Armenia yet.

Potentially invasive and expanding plant species

Short description of some aborigine and introduced plant species is given in this chapter. These species not distribute fast and widely currently or are natural elements of ecosystems (even more, they could be edificators of natural communities), but according literature data they are noxious invasive species in other countries and phyto-geographical regions.

From the huge list of weeds (more than 10000 species) we choose only species which are of interest for our country. First of all they are present now on the territory of Armenia (in any amount), and second – they are from categories “naturalized” and “environmental weed”, often they are described as “noxious weed” or “noxious invasive weed”. Agricultural weeds are not included in our list despite that during the time they can come in the category “environmental weed”.

Elaboration of this list had two main goals:

Choose alien and aborigine plant species which have now small area of distribution in Armenia, but according experience in other countries and regions have big potential for wide distribution in appropriate conditions. These species have to be a subject for future monitoring in our country.

Show common species from our flora which are noxious invasive species in other countries and regions. These species could serve as resources for investigations bio-control agents which could be find in our country and may be used in other regions.

For all species included in the list we give list of countries where they naturalized and are environmental weeds, distribution in Armenia and main habitats.

Control and eradication

The main activities which must be implemented in Armenia are described in this chapter. National strategy and National program on invasive alien species have to be elaborated. As first step of this program differentiation of noxious alien species from innocuous and/or useful species and estimation of their impact on biodiversity and natural ecosystems. Next step – elaboration of action plan on invasive and expanding species. This step includes risk assessment, and evaluation of benefits which could be received from using alien introduced species. According Global initiative on invasive species 4 main activities could be implemented:

- prevention
- early detection
- eradication
- control

We consider that National program on invasive plant species in Armenia has to be elaborated and regional system of observations, monitoring, data exchange and fast reaction has to be created. For this collaboration very good conditions exist between Armenia and Georgia, probably these two countries could be first two elements of this system, and then other countries of South Caucasian region could be involved in this system.

Investigation of invasive plant and animal species in Armenia January 2016 – December 2018

1. Modern situation

Invasive species are now one of the greatest threats to natural ecosystems, and their investigations and control and limitation are one of priorities in nature conservation. Also they threat agriculture, forestry, fishery as well human health. We define invasion as the act of exotic species entering natural communities, potential displacing native vegetation and species. At present, data on the spread and distribution of invasive plant and animal species in the territory of the Republic of Armenia, and their impact on agricultural and natural areas are missing. One of the objectives of this research proposal is the study of the recent spread of invasive species and their impact on biodiversity and natural ecosystems used as pastures, hayfields and disturbed forests.

Armenia is a Transcaucasian republic, bordering Georgia, Azerbaijan, Turkey, and Iran. It is a landlocked country with a total area of 29,740 km², and lies between 38°50' and 41°18' of northern latitude and between 43°27' and 46°37' eastern longitude, and measures 400 km along its main axis (Northwest to Southeast). Armenia is generally a mountainous country, having its lowest point at 375 m above sea level and culminating at 4095 m, with an average altitude of 1850 m. Variations in altitude have important effects on the climatic and landscape zones, and consequently on the vegetation of the country.

During last years (since 1992) the economic and energy crisis mainly threatened Armenia's forests. Poor forest management combined with illegal wood cutting for fuel and construction damaged about 10 % of the total forest area. At the same time, overgrazing destroyed the grasslands surrounding the villages and degraded the formerly unspoilt pastures of remote mountains.

Similarly to other Eastern European countries the period of economic transition seriously affected the development of the country agriculture. Small individual economies have become unprofitable in the majority of cases. Modern agricultural technology is of no avail on small private farms. As a result on the one hand the process of enlargement of agricultural economies started, and on the other hand remarkably big territories of agricultural land became abandoned and are not utilized as appropriate during last years. Also now Armenia is the main route between Iran and Georgia. The deficiency of the state quarantine

service has much facilitated the entry of new alien species in particular along transport routes. These alien species are potential hazards to biodiversity, agriculture and natural ecosystems. In addition, it is possible that some of the large stocks of crop seed stocks received as humanitarian assistance were contaminated by weeds.

Armenia is a unique country; it has very rich composition of ecosystems of different origin. Now there is a threat for changing natural ecosystems as a result of invasions alien plant and animal species. It is well known that many weed invasive species distribute in disturbed natural ecosystems. Now there is a situation in Armenia that weed species distribute in natural ecosystems, which used as pastures and hay lands, as well as in cutted and disturbed forests.

Until present time the problem of invasive species was practically not in the focus of attention in Armenia. Within last 50 years segetal flora and vegetation of the republic was investigated more or less in details. What about alien, invasive plant species – there were no special investigations carried out. New species detected on the territory of Armenia, herbarium sample of it was stored in the herbarium of the Institute of Botany of the NAS RA (ERE). The most interesting cases were published in articles about new findings in the flora of the republic. Species that were specially introduced and used for town and settlement greenery or artificial afforestation and further penetrated to natural ecosystems were totally out of attention. The first national report on Armenia biodiversity (1999) had a small section dedicated to alien invasive species. Presently Armenia is experiencing spontaneous dissemination of several species including jackal (*Canis aureus*), porcupine (*Hystrix leucura*), Persian squirrel (*Sciurus persicus*), musquash, pheasant, Caspian turtle (*Mauremis caspica*), crucial, silver carp, white carp, sazan (*Cyprinus carpio*), rainbow trout, crayfish.

2. Project goal

The main goals of this project are:

- Investigation of distribution of invasive species within the territory of Armenia.
- Estimation the risks and threat to natural ecosystems (especially included in the Resolution 4) from invasive species.
- Finding of new alien plants and animals.
- Conservation natural ecosystems, especially included in the Resolution 4.
- Assistance for rehabilitation of disturbed natural ecosystems, especially included in the Resolution

3. Project activities

The results of the project have to be a base for development a program for control of invasive and expansive plant species disturbed natural ecosystems. We propose to implement the following activities in the framework of the project:

1. To conduct survey and research in the territory of Armenia, especially in ecosystems included in the Resolution 4, to discover, sample and identify alien plant and animal species.
2. To discover, sample and identify insect species which could be used as biological control agents of invasive plants and weeds, and other invertebrates.
3. To elaborate an Action Plan to prevent the further introduction of invasive species both into the territory of Armenia and the territories of the neighboring countries in the South Caucasian region.
4. To evaluate results from the point of view possible cooperation with centers on fighting with invasive species in Europe and North America.

4. Directions of the project

As a result of the project implementation at first time the full list of invasive and expansive species disturbed natural ecosystems will be composed. Also at the first time distribution and threat to natural ecosystems from these species will be evaluated. New plant and animal species for the flora and fauna of Armenia will be found.

The project has multilateral directions.

1. Scientific – the investigations of invasive and expansive species and their threat to natural ecosystems will be conducted at first time in Armenia and South Caucasus.
2. Nature conservation – on the basis of the project results the measures of control of invasive species have to be elaborated. They have to assist to conservation of biodiversity in Armenia and neighboring countries.
3. Social-economic - implementation of the measures will assist to improvement of ecosystems used by local communities.
4. The project will assist to international cooperation in science and nature protection, because invasive species don't know administrative borders and they are a worldwide problem.
5. Description of project implementation

During implementation of the project traditional methods of botanical and zoological, including entomological, research will be used. First of all, natural ecosystems included in the Resolution 4 in different regions of the country will be studied in different seasons. Both botanical and zoological material will be collected and further identified at the species level. The threat to natural ecosystems will be evaluated according the rating system (see below).

Rating System

Category A. Plant and animal species that are invading and disrupting native plant communities in Armenia.

A-1--Widespread, essentially in all 12 floristic regions of Armenia

A-2--Regional species invasive in more than 6 floristic regions

A-3--Regional species invasive in 6 or fewer floristic regions.

Category B. Species that are occasional invaders with low levels of impact on natural Armenia ecosystems, or species which are invading and disrupting the natural ecosystems of other countries, in habitats similar to those found in Armenia.

Category C. Species that have the capacity to invade native ecosystems along disturbance corridors, or to spread from stands in disturbed sites into undisturbed areas, but which seem to principally spread and remain in disturbed corridors or agricultural areas.

Category D. Species for which current information does not adequately describe distribution or nature of threat to natural ecosystems.

Category E. Species that, after review of status, do not appear to pose a significant threat to natural ecosystems.

All data will be entered into a computer database, which will be available on a specially designed WEB-page by the end of the project and have to be passed to the Ministry of Nature protection of Armenia. A team of scientists who are dedicated to the preservation of Armenia's biodiversity has been assembled, including botanists, zoologists and entomologists with extensive experience in field and laboratory study of flora, vegetation and fauna of Armenia.

The field work organized as many expeditions is needed. Special attention has to be dedicated to ecosystems included in the Resolution 4. The big herbarium and entomological material have to be collected and worked out; field phyto-sociological descriptions of ecosystems have to be done as well as evaluation of distribution and threat of the most important invasive and expansive species. Possible bio-control methods and agents have to be finding.

We propose the project implementation during 3 years.

6. Project timetable

| NN | Activities | I year | II year | III year |
|----|---|--------------------------|--------------------|---------------------|
| 1 | The work with literature and herbarium, preliminary lists of invasive and expansive species working out | January - March | | |
| 2 | Fieldwork | March, 1 – September, 15 | March - September | May - August |
| 3 | Analysis of collected material | October - November | October - November | September - October |
| 4 | Reports | December | December | December |
| 5 | Creating and filling in the computer database | September | September | September |
| 6. | Publications and passing results of the project to the Ministry of Nature protection | | | June - November |

7. Project budget (in Euro)

| NN | Item | 1 st year | | 2 nd year | | 3 rd year | |
|----|--|----------------------|--------------|----------------------|--------------|----------------------|--------------|
| | | Per month | Per year | Per month | Per year | Per month | Per year |
| 1 | Salary | | | | | | |
| | Co-ordinator | 500 | 6000 | 500 | 6000 | 500 | 6000 |
| | Principal investigator | 500 | 6000 | 500 | 6000 | 500 | 6000 |
| | Plant taxonomist | 400 | 4800 | 400 | 4800 | 400 | 4800 |
| | Phyto-sociologist | 400 | 4800 | 400 | 4800 | 400 | 4800 |
| | Zoologist | 400 | 4800 | 400 | 4800 | 400 | 4800 |
| | Entomologist | 400 | 4800 | 400 | 4800 | 400 | 4800 |
| | GIS specialist | 300 | 1200 | 300 | 1200 | 300 | 1200 |
| | Technical assistant | 200 | 2400 | 200 | 2400 | 200 | 2400 |
| | SUBTOTAL: | | 34800 | | 34800 | | 34800 |
| 2 | Field-work: | | | | | | |
| | 5 scientists, 50 Euro per day, 30 days | 50 Euro x 5x 30days | 7500 | 50 Euro x 5x 30days | 7500 | 50 Euro x 5x 30days | 7500 |
| | Car rent, 60 Euro per day (including fuel) | 60x40 | 2400 | 60x40 | 2400 | 60x40 | 2400 |
| | SUBTOTAL: | | 9900 | | 9900 | | 9900 |
| 3. | Other expenses | | | | | | |
| | Materials translation | | 500 | | 500 | | 1000 |
| | Publications | | 1000 | | 1000 | | 2000 |
| | SUBTOTAL: | | 1500 | | 1500 | | 3000 |
| | TOTAL: | | 46200 | | 46200 | | 47700 |
| | TOTAL: | 140 100 | | | | | |

8. Expected outputs of the project

The main expected outputs of the project are:

1. Identification of invasive and expansive species in the territory of Armenia, and knowledge of their modes of dissemination.
2. Objective categorization of invasive and alien species introduced to the territory of Armenia.
3. An elaborated Action Plan for preventing introduction of invasive species in Armenia.
4. Prepared lists of potential biological control agents that are found in Armenia.
5. Completed computer database on invasive and expansive species and their insect controllers in Armenia.
6. Published scientific articles and special leaflets.

AUSTRIA / AUTRICHE

REPORT OF AUSTRIA ABOUT RELEVANT ACTIONS ON INVASIVE ALIEN SPECIES IN THE LAST TWO YEARS

1. GENERAL SITUATION – PROTECTED SPECIES / PROTECTED SITES

Austria with a total coverage of 83.870,9 km² is rich in landscapes and species. The country houses about 45.000 animal species, of which almost 37.000 are insects and nearly 3.000 are vascular plant species. 38 % of mammals, birds and fishes are either extinct or threatened to a varying degree. 64,3% of reptiles and 60% of amphibians are listed „vulnerable“, „endangered“, or „critically endangered“.

Austria is characterized by a high diversity of landscapes ranging from high alpine areas to the pannonian plains, from wetlands to forest regions. Austria's biodiversity has been shaped by human intervention throughout the ages, especially through agriculture and forestry, hunting and fishing. Among the main causes of biodiversity loss are habitat destruction, degradation and fragmentation, in particular the sealing and fragmentation of landscapes by settlements and transport infrastructure. Additional threats are the abandoning of traditional forms of land use and land use intensification, as well as threats caused by non-indigenous, invasive species.

About 35% of the territory is classified as protected under various protection categories. About 3,6% of the territory is under strict protection through the nature reserve designation. Categories of the protected areas include „protected landscapes“ (15,4% of the territory), „nature parks“ (4,39%), and „nature monuments“ (2%). Six National Parks cover 2,9% of the territory and are all recognized by the World Conservation Union – IUCN. As a member of the EU, Austria took part in NATURA 2000, the European network of protected sites, according to the Habitats (92/43/EWG) and Bird Directive (79/409/EWG). Austria has designated 214 NATURA 2000 sites, covering about 16% of the country which is part of two biogeographic regions: the alpine and the continental region. There are also 19 Ramsar sites covering 1,6% of the territory. Biosphere reserves covering 1,8%, Biogenetic reserves totaling 2,1%, three European Diploma sites and one Wilderness area („Wildnisgebiet Dürrenstein“). There are also 15 lakes protected under the Austrian Act on the Protection of Lakes.

2. NON-NATIVE, INVASIVE SPECIES

The ecological, economic and health-related impacts of non-indigenous species are considerably in many countries. They have been recognised to be one of the most important causes of biodiversity loss all over the world and, in many countries, lead to serious economic damage.

The Convention on Biological Diversity (CBD) was adopted in 1992 and ratified by Austria in 1994 (Federal Law Gazette No 213/95). According to Article 6 of the CBD every Contracting Party shall either develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity, or adapt its existing strategies, which in any case, are to reflect the measures set out in the Convention. According to this provision the National Biodiversity Commission in April 1998 set out the Austrian Strategy for the Implementation of the Convention on Biological Diversity based on the preparatory work of the Federal Environment Agency and presented it to the Federal Government.

On the basis of the evaluation of the Austrian Biodiversity Strategy it was decided to revise and further develop the Biodiversity Strategy. As a new instrument, action plans on topical issues which are to supplement the **Austrian Biodiversity Strategy** are being introduced. The **Austrian Action Plan on Invasive Alien Species** is to serve as a tool to further develop, and put into more concrete terms, the Austrian Biodiversity Strategy. This Action Plan is to be supplemented by detailed measures for selected species.

The Bern Convention was adopted and ratified by Austria on September 1st 1983.

3. STRUCTURE OF THE INVASIVE ALIEN ACTION PLAN (FEDERAL ENVIRONMENT AGENCY)

3.1 Scope

The Action Plan on Invasive Alien Species relates to alien species as defined in the CBD (Chapter 1.4.2) of all taxonomic groups and taxonomic levels (species, sub-species, strains, varieties etc.) This definition complies with the criteria applied in the study on alien species in Austria (ESSL & RABITSCH 2002). The Action Plan on Invasive Alien Species does not refer to genetically modified organisms (GMO).

3.2 Terminology

The Terminology is based on the definitions applied in the „Guiding Principles for the Prevention, Introduction and Mitigation of Impacts of Alien Species that Threaten Ecosystems, Habitats or Species“ of the 6th Conference of the Parties to the CBD (CBD/COP6/VI/23):

3.3 Structure

The Action Plan on Invasive Species is structured according to the following topical issues:

- Education and awareness-raising
- Capacity building
- Research and monitoring
- Legal and organisational implementation
- **Objectives:** Indication of the sub-goals to be reached within the framework of the Action Plan on Invasive Species.
- **Measures:** Indication of the measures required to reach the defined objectives. In some cases more than one measure has been assigned to one objective.
- **Time periods:** Indication of the period within which the proposed measures are to be launched.
 - Short term: < 3 years
 - Medium-term: 3-5 years
 - Long-term: > 5 years
- **Priority:** Indication of the degree of priority with which the proposed measures are to be implemented:
 - Low: Implementation of the proposed measures is moderately urgent to reach the objective
 - Medium: Implementation of the proposed measures is highly urgent to reach the objective
 - High: Implementation of the proposed measures is of essential importance to reach the objective.
- **Actors:** Indication of the institutions, groups of individuals, vocational groups and organisations concerned by the implementation of proposed measures. Indicated are all actors that may be of importance for the implementation of measures. This concerns the fields of funding and implementation (e.g. project management, integration of existing data, information and preparatory work).

4. ORGANISATION AND RESPONSIBILITY IN AUSTRIA

The Federal Republic of Austria is made of **nine Federal States (Bundesländer)** which have a strong local power and the sovereignty of law making in the nine autonomic regional parliaments. These Federal States are the following: Burgenland, Vienna, Lower Austria, Upper Austria, Salzburg, Styria, Carinthia, Tyrol, and Vorarlberg.

For example, Austria has nine different laws in nature conservation, fisheries and hunting, and an overall national law is lacking. The implementation of the Habitats Directive (92/43/EWG) and Bird Directive (79/409/EWG) has brought some harmonisation between the laws in nature conservation, fisheries and hunting.

It is the Ministry and the Federal Government which sign International Conventions, and they can make suggestions and proposals (especially the Federal Environment Agency) to the Federal States, but these are not binding legally. In Austria the power and authority **in nature conservation is in the hand and responsibility of the nine Federal States (Bundesländer)**. However, there is a coordination between them.

In this groups of experts within the Bern Convention. Dr. Manfred Poeckl speaks on behalf of the nine Austrian Federal States.

5. NEW ACHIEVEMENTS IN THE FEDERAL STATES

Campaigns in education and awareness-raising are being realised by meetings, folders and posters at different levels of education (from primary schools to universities and the general public) within the Federal States. Information is also broadcasted by regional radio and television programmes.

Especially in legally protected areas and sites, campaigns to control and eradicate invasive alien plant species are realised. These sites are monitored and the management success is evaluated. Long-term unemployed people are asked to take part voluntarily in eradication work.

Plant species that are controlled / eradicated in protected areas in the Federal States of Austria are the following: Japanese knotweed (Jap. Staudenknöterich, *Fallopia japonica*), Goldenrod (Kanad. Goldrute, *Solidago gigantea*), Himalayan balsam (Ind. Springkraut, *Impatiens glandulifera*), Ragweed (Beifuß-Ambrosie, *Ambrosia artemisiifolia*), Giant hogweed (Riesenbärenklau, *Heracleum montegazzianum*), Bloodflower (Seidenpflanze, *Asclepias currossavica*), American pokeweed (Amerikanische Kermesbeere, *Phytolacca americana*), but also two tree species, the Robinia (Robinie, *Robinia pseudacacia*) and the Holly (Götterbaum, *Ailanthus altissima*).

Special attention is paid to the cultivation of new disturbed soils after the finish of construction works, especially infrastructure projects and works along streams and rivers. It is no longer wise to allow the free natural succession of soils to pioneer plants because most of these are invasive alien species.

For biotope management more and more grazing projects are realised, especially in protected sites and along streams and rivers. Livestock involved are mostly cattle, sheep and horses.

Regionally a number of small projects are being realised, and there are many different bodies, NGOs and stakeholders involved.

More focus has to be paid on the flow of information in the bottom-up direction. In other words: it is hard to follow and overlook the many enthusiastic and excellent work done at the regional and local scale. People at those lower levels often forget to report their activities, results and success to the higher interested authorities (Landesregierungen, Ministerien).

The activities, the engagement and enthusiasm of people is outstanding. However, a higher degree on communication, cooperation and collaboration has to be reached within and between the Federal States on the one hand and to the Ministry and Federal Governments on the other.

No information is available about control or eradication activities referring to non-native, invasive animal species.

6. ACTIVITIES IN LOWE AUSTRIA AS AN EXAMPLE

- **NSG Pielach-Neubacher Au:** Weidemonitoring - Neophytenbekämpfung durch Beweidung (2008-2014)
 - (Springkraut *Impatiens glandulifera*, Japanischer Knöterich *Fallopia japonica*, Goldrute *Solidago canadensis*)
 - Monitoring ist abgeschlossen, Erfolg der Reduktion von Neophyten durch Beweidung allein nicht ausreichend, Beweidung wird aber fortgesetzt, zusätzliche Pflegemaßnahmen sind erforderlich
- **Biosphärenpark Wienerwald:** Neobiotaekämpfung und Managementmaßnahmenentwicklung (2011-2015)
 - (Springkraut *Impatiens glandulifera*, Japanischer Knöterich *Fallopia japonica*, Riesenbärenklau *Heracleum giganteum*, Robinie *Robinia pseudoacacia*, Götterbaum *Ailanthus altissima*, Signalkrebs *Pacifastacus leniusculus*, Rotwangenschildkröte *Trachemys scripta elegans*, Gelbwangenschildkröte *T.s.scripta*, Goldfisch *Carassius gibelio*, Waschbär *Procyon lotor*, Marderhund *Nyctereutes procyonoides*)
- **Nationalpark Donauauen:** Neophytenmanagement (ab 2013)
 - (Eschenahorn *Acer negundo*, Götterbaum *Ailanthus altissima*)
 - laufende Maßnahmen zur Reduktion durch Ringeln
- **Nationalpark Thayata** Neophytenmanagement seit 2000
 - Indisches Springkraut (*Impatiens glandulifera*), Robinie (*Robinia pseudoacacia*), Staudenknöterich (*Fallopia japonica*), Riesenbärenklau (*Heracleum giganteum*)
 - Aktuell noch Schwerpunkt auf Robinie, ansonst laufende Nacharbeiten nach Bedarf; Sprinkrautbekämpfung weitestgehend abgeschlossen
- „**Wachau Volunteer**“ Bekämpfung von Götterbaum und Robinie ist regelmäßiger Bestandteil des Projektes;
- **LIFE Untere March-Auen** hat Neophyten-Bekämpfungs-Teil, Betreuung durch WWF;
- **Neubacher Au:** „Act for Nature“ der NFI (http://www.nfi.at//index.php?option=com_content&task=view&id=681&Itemid=225)
Springkrautbekämpfung (startet jetzt aber erst!);
- **Auenwildnis Wachau:** Neophytenmanagement ist inkludiert, (startet erst!)
- **March-Thaya-Auen:** „Ramsar SKAT“ (ist aber Ende 2012 ausgelaufen!) aktive Bürgerbeteiligung an Pflege- und Erhaltungsmaßnahmen zum Schutz dieser international bedeutenden Feuchtlebensräume; gemeinsam mit österreichischen und slowakischen Projektpartnern und den March-Thaya-Gemeinden wurde u.a. Eschenahorn entfernt.

AUSTRIA / AUTRICHE

STATUS OF AZERBAIJAN'S BIODIVERSITY

The Republic of Azerbaijan is situated at the juncture of several bio-geographical areas - the Eastern Palearctic, Turan, the Mediterranean, Asia Minor, and the Middle East - and contains species of European, Central Asian and Mediterranean origin. The country forms an integral part of the *Caucasus Ecoregion*, a region with exceptional levels of biodiversity. Azerbaijan also shares the largest inland body of water in the world, the Caspian Sea, with four other countries (Russia, Iran, Turkmenistan and Kazakhstan). The biological diversity of the Caspian Sea and its coastal zone makes the region particularly significant.

Azerbaijan can be divided into the following five broad ecosystem complexes, all of which contribute to the high levels of biodiversity represented in the country:

- Forest ecosystems;
- Freshwater, wetland and swamp ecosystems;
- Grassland and semi-desert ecosystems;
- High mountain ecosystems; and
- Marine and coastal ecosystems.

In 2012, a revised and updated edition of the *Ecoregion Plan for the Caucasus* identified and delineated the key Priority Conservation Areas, and associated wildlife corridors, in four priority biomes – forest; freshwater and wetland; coastal and marine; and high mountain - for the ecoregion, including the entire territory of Azerbaijan. These PCAs provide a spatial focus for the implementation of conservation measures, including: land-use zoning; establishment/expansion of protected areas; creation of wildlife corridors; improved monitoring and enforcement; and targeting mainstreaming activities in Azerbaijan.

The *National Caspian Action Plan* (NCAP) identifies the key marine and coastal habitats requiring focused conservation actions in Azerbaijan's territorial waters of the Caspian Sea.

Limited institutional capacities in the mapping and classifying of ecosystems and habitats, as well as in the development of thresholds to assess their threat status, means that it is not yet possible to objectively report on ecosystem and habitat trends in Azerbaijan. The MENR is however, with the support of the *Deutsche Gesellschaft für Internationale Zusammenarbeit* (GIZ), developing a National Biodiversity Monitoring System (NBMS) for Azerbaijan. The first version of the NBMS (2013) defines 20 pressure, state and response indicators, of which 15 are considered as priority indicators for the country.

In August 2013, the 2nd edition of the *Red book of Azerbaijan* was published. The Red Book contains updated information on the status of rare, threatened and endangered wild plant and animal species for the entire territory of the country, including Azerbaijan's sector of the Caspian Sea. The current version of the Red Book lists 338 species of higher plants, 12 species of fungi, 23 species of lower plants and 223 species of fauna (including 74 insect species, 6 amphibian species, 14 reptile species, 9 fish species, 72 bird species and 42 mammal species). This represents a significant increase in the number of rare, threatened and endangered species that were recorded in the 1st edition of the 'Red Book of Azerbaijan' (1989) - 108 animal species and 140 plant species – although this, may in part, be attributed to an improvement in the research and monitoring capacity of the Azerbaijan National Academy of Sciences (ANAS).

In 2011, the Secretariat of the Framework Convention for the Protection of the Marine Environment of the Caspian Sea published the *Caspian Sea: State of Environment* report. The report highlights the main trends in the marine and coastal environment of the Caspian Sea. It provides a gap analysis, showing the

needs and requirements of the countries, individually and collectively, in the areas of monitoring, information collection and management related to policy, decision-making and implementation of the Tehran Convention and its Protocols.

Key pressures on Azerbaijan's biodiversity include:

- (i) Land degradation: extensive salinization; widespread soil erosion; weak regulation of building and construction activities; and pervasive use of fertilizers, pesticides, and herbicides.
- (ii) Habitat fragmentation: harvesting of timber; conversion of grasslands for agriculture; damming of rivers; expanding the network of irrigation channels in steppe ecosystems; and outbreak of wildfires.
- (iii) Unsustainable levels of natural resource use: overgrazing in grasslands and semi-arid areas; hunting of wild birds and game species; over-fishing of sturgeon and other commercial fish species; and poorly maintained water distribution systems.
- (iv) Pollution: limited infrastructure and capacity for effective waste management; weak storage capacity for hazardous wastes; residual oil pollution; incoming municipal, industrial and agricultural wastes from trans-boundary rivers.
- (v) Invasive species: marine and terrestrial spread
- (vi) Climate change: weak adaptation and mitigation capacities

The root causes of environmental degradation in Azerbaijan lie in four main areas. **First**, while the collapse of Soviet rule in 1991 was liberating, it also left much of the population poorer than before and without the free basic services (e.g. housing, electricity, water, gas) that were previously provided under the Soviet regime. **Second**, the continuing hostile conflict between Azerbaijan and Armenia over the Armenian occupation of the territory of Daghigh-Garabagh (Nagorno Karabakh) and surrounding areas has resulted in hundreds of thousands of refugees living as internally displaced persons. **Third**, while Azerbaijan's petrochemical resources provide a driving force for its economy and is a major source of worldwide oil reserves, the environment has suffered from contamination as a result of oil production and transport. **Fourth**, following Soviet rule, markets (that were previously available in the Soviet Union) for agricultural and other service products diminished, driving more people into poverty. Individual species, habitats, ecosystems and ecosystem processes have thus suffered as a result of a combination of these various factors. It is only over the last few years that the Azerbaijan Government has successfully initiated efforts to redress these socio-environmental legacies.

Azerbaijan's policy and legislative environment for biodiversity is reasonably comprehensive. The main elements, along with their associated regulations, include:

- The Law on Environmental Protection (1999);
- The Law on Specially Protected Nature Areas and Objects (2000);
- The Law on Fauna (1999);
- The Law on Phyto-sanitary Control (2006);
- The Forest Code (1997)
- The Law on Hunting (2004); and
- The Law on Fishing (1998)

Azerbaijan has also ratified the *Framework Convention for the Protection of the Marine Environment of the Caspian Sea* (the 'Tehran Convention') which entered into force in 2006.

The institutional environment for managing and conserving biodiversity in Azerbaijan has not changed substantially in the last four years. The Ministry of Ecology and Natural Resources (MENR) remains the primary government agency responsible for biodiversity conservation and the sustainable use

of natural resources (i.e. forestry, wildlife, and fish). The key responsibilities of MENR cover six broad areas: (i) environmental policy; (ii) environmental protection; (iii) water management and monitoring; (iv) protection of coastal and marine natural resources; (v) forest management; and (vi) protected areas.

The International Commission on Aquatic Resources of the Caspian Sea (ICARCS) regulates fisheries in the Caspian Sea region by defining the Total Allowable Catch (TAC) and distributing the catch quota regarding major commercial fish species (sturgeon, sprat, seals) between Iran, Kazakhstan, Russia, Azerbaijan and Turkmenistan.

Invasive species

There are several species that are considered to be invasive in Azerbaijan. One of the most notable is the comb jelly *Mnemiopsis leidyi* - an introduced species that invaded the Caspian Sea through the Volga Don channel. Its population has now multiplied to the extent that the biomass of the population has exceeded the general productive biomass of the sea. It has no natural predators, and climatic conditions favour its growth and reproduction. It feeds on animal plankton, including the planktonic larvae of fish, and as such, is capable of seriously undermining economically and biologically important fish (e.g. sturgeon) and mammal (e.g. Caspian Seal) populations.

Invasive plant species include the widely distributed common ragweed (*Ambrosia artemisiifolia*), buffalo bur nightshade (*Solanum rostratum*) and the Russian knapweed (*Acroptilon repens*).

The introduced American racoon (*Procyon lotor*) has now successfully spread into most of the forests of Azerbaijan. The invasive fall webworm (*Hyphantria cunea*) is also known to cause substantial damage to commercially grown ornamental trees and shrubs and to several agricultural crops.

BELGIUM / BELGIQUE

ACTIONS TAKEN IN BELGIUM IN RESPONSE TO THE THREATS OF INVASIVE ALIEN SPECIES WITH FOCUS ON THE TIMEFRAME 2011-2013

PLANIFICATION

Belgium's National Biodiversity Strategy 2006-2016 (NBS) was adopted on 26 October 2006 by the Inter-ministerial Conference for the Environment. This National Biodiversity Strategy was updated in 2013 with the aim to translate the contribution of Belgium to the implementation of the EU Biodiversity Strategy (2011-2020), the CBD Strategic Plan and its Aichi targets, and the other commitments made under biodiversity-related agreements into national policy.

The following strategic and operational objectives of the NBS are directly related to IAS:

- Strategic objective n°3: Maintain or restore biodiversity in Belgium to a favourable conservation status (new operational objective n°3.7.: “Invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment”)
- Strategic objective n°5: Improve the integration of biodiversity concerns into all relevant sectoral policies (operational objective n°5.7.: “Consider the potential impact on biodiversity, and in particular the invasiveness of species, in making import and export decisions”).

Other strategic and operational objectives are also indirectly related to IAS (strategic objectives 2, 7, 10; operational objectives 3.6) and the implementation of the NBS should apply the precautionary principle.

The 2009-2013 federal plan for the integration of biodiversity in 4 federal key sectors (economy, science policy, development cooperation and transport), adopted in 2009, addresses the issue of invasive alien species in:

- the economic sector: develop federal instruments to limit the introduction of IAS in Belgium (proposed actions : awareness raising activities towards key economic sectors / Broaden and update the legal framework at federal level)
- the science policy sector: Put in place an early warning system for the detection of IAS (proposed actions : Risk analysis and finalisation of IAS lists in Belgium)
- the transport sector: Take biodiversity into account in the marine transport by limiting introduction of IAS (proposed actions : control and manage ballast water, consider the risk of introduction of IAS in marine areas in the development of the federal marine policy).

To comply with the EU Regulation 1143/2014 on Invasive Alien Species, a Belgian working group on Invasive Alien Species was installed. A cooperation agreement is being developed to ensure an efficient implementation of the IAS legislation taking into account the responsibilities of the different authorities. This agreement also installs a formal contact group with the aim of providing a scientific background to political decisions and the administrative and political aspects in order to prepare Belgian positions for international meetings, elaborating programs related to Belgian international obligations and providing adequate feedback from the international decision-making scene to the scientific community. Belgium also actively participates in the European scientific forum, committee and working group on invasive alien species.

Regional initiatives

In Wallonia, preventive and control actions against biological invasions were included into the governmental plan (2009-2014). An IAS action plan was officially adopted in November 2009. The main objectives of this plan are to address preventive actions, early detection, management actions, regulatory instruments, scientific research and communication. Those missions are coordinated by a dedicated structure of the regional environmental administration (Cellule interdépartementale Espèces invasives) made of 4 full time equivalents.

In Flanders, the Agency for Nature and Forest developed a vision statement and action plan for the period 2013-2016 in which prevention, rapid response, control actions and horizontal needs (such as policy framework, communication and knowledge/research) are dealt with.

Brussels Environment, the administration on energy and environment of the Brussels-Capital Region, is finalizing the draft version of the first Nature Report. This Report, that has to be adopted by the Brussels Government, will list all measures on nature conservation for the next five years. In this stadium, a lot of attention is put on the management of (invasive) alien species, by means of prevention, control and sensibilisation.

PREVENTION

Legislation

Federal:

The law of 12 July 1973 on nature conservation has been modified by the law of 12 July 2012 in order to set out clearer legal framework on IAS at the federal level. Five measures are concerned: (a) better legal understanding of the measures to possibly be taken at the level of import, export and transit of IAS, (b) possibility to create a federal Advice Committee on IAS, (c) possibility to conclude sectoral agreement with firms that participate to the dissemination of IAS, (d) updating of the criminal sanctions and possibility to impose administrative fines and e) updating of the provisions related to inspection.

Based on 1973 law and as a transposition of the Birds directive, measures related to importation, exportation and transit of non-indigenous wild bird species are taken (excepted if the birds were bred in captivity) (26/10/2001. - Arrêté royal portant des mesures relatives à l'importation, à l'exportation et au transit de certaines espèces d'oiseaux sauvages non indigènes. : Art. 3. § 1).

Apart from the 1973 general framework, three other legal instruments deal with IAS :

- Article 4 of CITES Regulation (Council Regulation (EC) No 338/97 on the protection of species of wild fauna and flora by regulating trade therein) imposes ban restrictions on species that pose a threat to native species. Currently, 7 species are concerned with 3 squirrels being the late listed in 2012 (*Calloscirus erythraeus*, *Sciurus caolinensis* and *Sciurus niger*).
- Royal Decree of 19 November 1987 concerning measures against organisms harmful to plants and plant products (measures for brown rat, muskrat and grey squirrel) is currently under revision, in consultation with the 3 regions, but currently still in force.
- As a transposition of directive 2004/35/EC of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage, a specific liability regime has been enacted for damages arising from the transport of IAS: federal legislation for prevention / remediation of damage resulting from transport by road, railway, navigable waterways or air of non-native animals, plants and parts thereof, following their import, export and transit into the country (Royal Decree of 8 November 2007). This regime provides i.a. for notification duties; the possibility of substitution by the competent authority; cost allocation; possible deposits and guarantees to support cost recovery; and a possible procedure for cost recovery linked to damage caused outside Belgian territory.

North sea:

The deliberate introduction of alien species in the marine environment is forbidden (Royal Decree on the protection of species in the marine waters under Belgian jurisdiction, 2001).

The Belgian law of 20 January 1999 on the protection of the marine environment in marine areas under Belgian jurisdiction (MMM law) forbids the intentional introduction of non-indigenous species in the marine environment without special license (Art. 11, §1). This provision mirrors those included in international instruments like the CBD.

The unintentional introduction of non-indigenous species via ballast water of ships can be prohibited by royal decree (Art. 11, §2). Belgium takes part to related IMO discussions/instruments (like the convention on ballast water) dealing with the issue of non-indigenous species in ballast water of ships. For the protection of the marine biota, measures can be taken (by royal decree and after scientific consultation) for the extermination of non-indigenous nuisance species (Art. 11, §3).

The new law also prohibits the intentional introduction of genetically modified organisms into marine areas (Art. 11, §4).

The European Marine Strategy procedure (Directive 2008/56/EC) has been implemented for the Belgian marine waters. One of the indicators pertaining to the achievement of the good environmental status is “non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystems.”

The Federal Public Service Health, Food Chain Security and Environment – DG Environment has also prepared the enforcement of the COUNCIL REGULATION (EC) No 708/2007 of 11 June 2007 concerning use of alien and locally absent species in aquaculture within the permit system for aquaculture activities in the Belgian part of the North Sea.

The Federal Public Service Health, Food Chain Security and Environment – DG Environment, as member of the national IAS working group, is currently preparing the cooperation agreement on IAS and the implementation of the EU Regulation 1143/2014 on Invasive Alien Species.

Flanders:

It is illegal to introduce any alien species in the wild in Flanders (article 17, [Besluit van de Vlaamse Regering van 15 mei 2009 met betrekking tot soortenbescherming en soortenbeheer](#) (BS: 13/08/2009), in short ‘Soortenbesluit’).

Some exceptions to this rule apply:

- specimens of plant species that are cultivated in the frame of Legal forestry, agriculture or horticultural activities or in the frame of garden or park management:
- specimens of fish reared in closed waters that guarantee that specimens can not move to open waters.

Precautions need be taken that the above exceptions do not result in introducing alien specimens in the wild.

In addition, separate fish legislation allows the introduction of alien species in open waters, in which case the ‘Soortenbesluit’ does not apply

Further, introductions in the wild are possible, but impact assessment has to be completed and has to confirm that there are no risks for unfavourable consequences for in Flanders native nature (Art. 21. §2).

To allow reducing negative impact on native biodiversity of IAS in the wild, to mitigate or to restore, the Flemish minister responsible for the Environment can take measures (articles 28, 29, 30 and 31 of the ‘Soortenbesluit’).

The following actions are possible:

- actions for increasing awareness including facilitating codes of conduct;
- doing, letting do, or enforcing of specific management and control;
- making agreements with local governments and/or organisations aiming at local actions; and
- limiting or prohibiting transport, trade and possession.

The Agency of Nature and Forest is currently revising the ‘Soortenbesluit’ (species legislation) in order to meet the requirements set out by the EU Regulation 1143/2014 on Invasive Alien Species and to indicate how invasive alien species can be managed.

The Agency of Nature and Forest; the Environment, Nature and Energy Department; the Flanders Marine Institute and the Research Institute for Nature and Forest as members of the national IAS working group, are currently preparing the cooperation agreement on IAS and the implementation of the EU Regulation 1143/2014 on Invasive Alien Species.

Brussels:

Since March 1 2012 a new legislation on nature “Legislation concerning Nature Conservation” is in force. This legislation sets the framework for installing action plans for IAS, includes a ban on introducing invasive alien plant and animal species in the wild and a ban on internal trade or obtaining (with in annex the concerned list of species).

The Brussels Institute for Management of the Environment as member of the national IAS working group, is currently preparing the cooperation agreement on IAS and the implementation of the EU Regulation 1143/2014 on Invasive Alien Species.

Wallonia:

From the Law on Nature Conservation, the introduction of non-indigenous species or indigenous species of non-indigenous origin in nature is forbidden excepted for species used for agriculture and forestry purposes (Décret relatif à la conservation des sites Natura 2000 ainsi que de la faune et de la flore sauvage (published on 22 January 2002)). A new Decree is in preparation on the same legal basis to offer a coherent and global framework to cope with invasive alien species, including prevention and control actions.

On top of that, several topical instruments are already in force, including hunting regulation for the destruction of alien vertebrates (guidelines 2688, M.B. 07/03/2007). New guidelines were just adopted in order to minimize unintentional and deliberate introduction of invasive plants through public call for tenders; they refer to non-native plant species listed in the Belgian Code of conduct on invasive alien plants negotiated with the nursery industry (AlterIAS, see next point).

The Public Services Department of the Walloon Government and the Natural and Agricultural Environment Studies Department as members of the national IAS working group, are currently preparing the cooperation agreement on IAS and the implementation of the EU Regulation 1143/2014 on Invasive Alien Species.

Codes of conduct

AlterIAS (www.alterias.be) is a communication project focused on prevention to reduce deliberate introductions of invasive plants. Varied communication actions are realized (e.g. articles in press or in horticulture magazines, information sessions, TV or radio reportages, etc.) and several communication tools are used (folders, brochures, posters, documentary film, newsletter, etc.). A Code of conduct was developed in consultation with horticulture professionals, scientists and representatives of administrations. Five measures were approved: (1) know the list of invasive plants in Belgium; (2) stop the trade and the plantation of some invasive plants; (3) disseminate information on invasive plants; (4) promote the use of non-invasive alternative plants and (5) participate in early detection of new invaders. Restrictions of use

target a list of 28 problematic species negotiated with the sector. The Code was launched in September 2011. This voluntary instrument is based on individual commitment.

Risk Assessment

A list system of non-native organisms established in Belgium was developed at the initiative of scientists gathered within the Belgian Forum on Invasive Species (see: <http://ias.biodiversity.be>). It aimed to help land managers and policy makers in the identification of species of most concern for preventive or mitigation actions, namely action plans, legislative tools and voluntary codes of conduct. Lists were built using a standardised assessment protocol, ISEIA (Invasive Species Environmental Impact Assessment), which allows assessing and categorising exotic species from any taxonomic group according to their invasion stage in Belgium and to their impact on native species and ecosystem functions. The ISEIA protocol was one of the first national standardised risk assessment tools developed for non-native species (Verbrugge et al. 2010) and it has been used as a model for the development of other comparable initiatives in Europe (e.g. Parrott et al. 2009).

Harmonia+, an updated version of the ISEIA protocol has been produced recently. It was designed as a robust risk analysis scheme because of the following structural underpinnings : (i) scientific experts from very different fields were contracted to provide input on components of the scheme, (ii) it strived to be maximally compliant with authoritative bodies from these fields (cf. EPPO in plant health, OIE in animal health, WHO in human health and the new EU Regulation on IAS in biodiversity), (iii) the invasion stages are based on a unified framework for biological invasions and (iv) scientific literature was used as the primary information source during protocol development. armonia+ may be used for two specific purposes, i.e; prioritization and horizon scanning exercises (production of alert lists) as well as to underpin detailed risk analyses.

More: B D'hondt, S Vanderhoeven, S Roelandt, F Mayer, V Versteirt, T Adriaens, E Ducheyne, G San Martin, JC Grégoire, IStiers, S Quoilin, J Cigar, A Heughebaert, E Branquart (2015) Harmonia + and Pandora +: risk screening tools for potentially invasive plants, animals and their pathogens. *Biological Invasions* 17(6): 1869-1883.

In addition, detailed PRA's were made for 24 invasive, but in Belgium not widely spread species. These PRA's were made at the geographic level of Belgium and will be used when evaluating for which of these species trade restrictions are a useful measure both at the import/export level (in Belgium this is federal competence) as on the internal trade and possession level (regional competence).). An outscaling exercise of those risk analysis reports is currently in progress in order to make them compliant with the new EU IAS Regulation and have the possibility to propose species inclusion within the IAS list of EU concern.

Monitoring and Early detection

Across Belgium, the different regional governments together with the nature NGO's Natuurpunt and Natagora set up an early warning system for reporting on observations by naturalists of about 70 species of IAS. Identification tools for the species included are available at www.waarnemingen/be/exoten. Managers and policy actors can subscribe to free email alerts within the system and stay informed on the occurrence in Belgium or at a smaller scale for one or more of the selected species of IAS. Based on this early warning system, multiple rapid response actions for several species have been conducted in the recent years.

In addition, a dedicated website has also been developed to allow reporting of a few invasive organisms on the Walloon territory by the general public (e.g. giant hogweed and invasive aquatic plants, see: <http://biodiversite.wallonie.be/invasives>).

A high end business analysis and subsequent functional analysis are planned in order to investigate how a structural IAS monitoring/early detection system complying with the EU Regulation 1143/2014 on Invasive Alien Species could be set up.

MITIGATION

Population control measures

Identification of best practices

- Best practices have been investigated by Gembloux Agro-Bio Tech (Wallonia) to control the following plant species: *Acer rufinerve*, *Cotoneaster horizontalis*, *Crassula helmsii*, *Fallopia* spp., *Heracleum mantegazzianum*, *Hydrocotyle ranunculoides*, *Impatiens glandulifera* and *Spiraea* spp.
- Within the INVEXO project (European Interreg-project IV A) control and study of control occurred for Floating Pennywort (*Hydrocotyle ranunculoides*), largeflower primrose willow (*Ludwigia grandifolia*) and parrot feather (*Myriophyllum aquaticum*) in waterways; for Black cherry (*Prunus serotina*), for American bullfrog and summering geese (including invasive Canada goose and Egyptian goose and feral domesticated goose).
- In Flanders, best available management practices for about 70 IAS plant species were summarized and made available, both in printed and digital form. A dedicated IAS section was developed on the knowledge platform Ecopedia (www.ecopedia.be/inleiding_exoten) with, besides best practices, general information on invasive alien species, the EU Regulation, prevention and early warning. Additionally, a general best practice guideline for animal species and, based on this guideline, best practices for American bullfrog *Lithobates catesbeianus* and Muntjac *Muntiacus Reevesi* have been developed.
- The RINSE (<http://www.rinse-europe.eu/>) project (EU Interreg IV A 2Seas) comprised several research and dissemination activities of best practices for management of IAS within the 2Seas area: demonstrations of invasive geese management, management of *Crassula helmsii*, invasive topmouth gudgeon *Pseudorasbora parva* and invasive dune plants (*Rosa rugosa*, *Mahonia aquifolium*) as well as several workshops and conferences on management of invasive birds and mammals.
- SEFINS (Safeguarding the Environment from Invasive Non-native Species; <http://www.rinse-europe.eu/sefins>) is an Interreg cluster project within the 2Seas program, clustering the previous RINSE and MEME projects. SEFINS is focussed on IAS of the estuarine environment, there where RINSE and MEMO were focussed on the terrestrial and marine environment, respectively.

Control actions

Different actions are undertaken to control some invasive alien species in the three regions of the country. Most actions are undertaken at local scale but a few eradication plans have been also launched (e.g. *Heracleum mantegazzianum* and *Oxyura jamaicensis*) (see table). The Giant Hogweed eradication plan is based on in-depth inventory of plant populations and management by both public and private owners in Wallonia (see: www.wallonie.be/berce).

Table 1 – Control measures undertaken against a selection of the more important invasive alien species in the different regions of Belgium. Different categories: absent (species not established in region), no (no action), local (actions undertaken to eradicate or decrease population density at local scale), mitigation (actions undertaken to decrease population density at the regional scale) and eradication (actions aiming to eradicate the species from the region).

| | List | Brussels | Flanders | Wallonia |
|-------------------------------------|-----------|-------------|--------------------------------------|-------------|
| Aquatic plants | | | | |
| Crassula helmsii | A1 | Absent | Local | Local |
| <i>Hydrocotyle rancunculoides</i> | A2 | No | Eradication | Mitigation |
| <i>Ludwigia spp.</i> | A2 | ? | Eradication | Mitigation |
| <i>Myriophyllum aquaticum</i> | A2 | No | Eradication | Mitigation |
| <i>Myriophyllum heterophyllum</i> | A1 | Absent | No | Absent |
| <i>Azolla filiculoides</i> | B2 | ? | Local | No |
| Terrestrial plants | | | | |
| Acer rufinerve | B1 | No | No | Eradication |
| <i>Ailanthus altissima</i> | A2 | No | No | Local |
| <i>Baccharis halimifolia</i> | A1 | Absent | Eradication | Absent |
| <i>Cotoneaster horizontalis</i> | A2 | No | Local | Local |
| <i>Impatiens glandulifera</i> | A3 | Local | Local | Local |
| <i>Fallopia spp.</i> | A3 | Local | Local, mitigation along watercourses | Local |
| <i>Heracleum mantegazzianum</i> | A3 | Local | Local | Eradication |
| <i>Mahonia aquifolium</i> | A2 | No | Local | Local |
| <i>Prunus serotina</i> | A3 | Local | Local | Local |
| <i>Quercus rubra</i> | B3 | ? | Mitigation | Local |
| <i>Rhododendron ponticum</i> | A2 | No | Local | No |
| <i>Ribes aureum</i> | | ? | Local | No |
| <i>Robinia pseudoacacia</i> | B3 | ? | Local | Local |
| <i>Rosa rugosa</i> | A2 | No | Local | No |
| <i>Spiraea spp.</i> | A3 | No | Local | Local |
| <i>Solidago canadensis/gigantea</i> | A3 | ? | Local | Local |
| Invertebrates | | | | |
| <i>Aedes japonicus</i> | | Absent | Eradication | Eradication |
| Batracians | | | | |
| Lithobates catesbeianus | A2 | Absent | Local | Local |
| Reptiles | | | | |
| Trachemys scripta elegans | | Local | Local | Local |
| Birds | | | | |
| Alopochen aegyptiacus | A3 | Local | Local | Local |
| <i>Branta canadensis</i> | A3 | Local | Mitigation | Local |
| <i>Oxyura jamaicensis</i> | A1 | Eradication | Eradication | Eradication |
| Psittacula krameri | B2 | ? | No | No |
| Mammals | | | | |
| Callosciurus erythraeus | A1 | Absent | Eradication | Absent |
| <i>Castor canadensis</i> | B1 | Absent | Absent | Eradication |
| <i>Muntiacus Reevesi</i> | A0 | Absent | Local | Absent |
| <i>Myocastor coypus</i> | A1 | Absent | Eradication | Eradication |

| | | | | |
|----------------------------|----|--------|-------------|------------|
| <i>Ondatra zibethicus</i> | A3 | Local | Eradication | Mitigation |
| <i>Procyon lotor</i> | A2 | Absent | Local | Local |
| <i>Rattus norvegicus</i> | A3 | Local | Mitigation | Mitigation |
| <i>Rattus rattus</i> | - | Absent | Mitigation | Mitigation |
| Fish | | | | |
| <i>Pseudorasbora parva</i> | A2 | ? | Mitigation | Mitigation |

SUPPORTING MEASURES

Communication, Education and Public awareness

- Through AlterIAS (www.alterias.be) the whole ornamental horticulture supply chain in Belgium, including plant growers and retailers, garden contractors, public green managers, landscape architects, horticulture teachers and garden amateurs, was targeted for raising awareness about the environmental risks of invasive plants. Several communication campaigns were initiated, dealing with general information on invasive ornamental plants and the promotion of a developed code of conduct in order to encourage its support and subscription from horticulture professionals. A variety of communication tools were produced to this purpose: website, DVD, TV and radio reportages, brochures, folders, posters, and articles in horticultural magazines.
- Other punctual communication actions were undertaken, with various taxa at target, including amongst others a workshop on invasive alien plant species, a presentation on *Muntingia calabura*, press communication on invasive geese and a communication campaign on *Vespa velutina*. Multiple papers and interviews were conducted on this topic during the last years in the press. Public awareness is systematically integrated in each large-scale project dealing with invasive alien species in Belgium (e.g. INVEXO, AlterIAS, Rinse).
- Several dedicated websites on IAS were also developed (see point 8).

Research

An analysis of the research projects on biological invasions being conducted by Belgian scientists from 1990-2009 is available (Branquart et al. 2010). More information: Branquart, E. et al. (2010) Research on biological invasions: a Belgian perspective. In: H. Segers & E. Branquart (Eds), proceedings of the Science Facing Aliens Conference, Brussels, May 11th 2009. A recent update for the period 2009-2013 is not available.

Five main research avenues were identified: invasion patterns, mechanisms and evolution of invasive species, impacts, risk assessment and management. Today, Belgian research dedicated to biological invasions has been shown to enter in a maturity phase and reaches high quality standards. Some research topics are well developed by Belgian teams and can be considered as very competitive within the international arena, like the studies dedicated to the evolutionary and ecological mechanisms of plant invasions or to those focusing on the spatial dynamics of invasions.

In addition the following actions do occur:

- The Nature, Forest and Woods Research Center is monitoring invasive species in the Walloon watercourses.

- Alien species are identified through inventories of species for some groups (e.g. mosses and liverworts, vascular plants, crustaceans, birds, mammals) in Wallonia.
- There is a program in which rare, colonial and introduced breeding bird species are being monitored in Flanders. Among them, alien breeding bird species as the lesser white-fronted goose (*Anser erythropus*), the Canada goose (*Branta canadensis*), the barnacle goose (*Branta leucopsis*), the Nile (Egyptian) goose (*Alopochen aegyptiacus*), the mandarin duck (*Aix galericulata*), the ring-necked parakeet (*Psittacula krameri*) and the monk parakeet (*Myiopsitta monachus*) are being monitored. This program is called the 'Bijzondere Broedvogels Vlaanderen Project' (Flemish Special Breeding Bird Project).). Meanwhile, some alien bird species are also monitored within the framework of the common breeding birds monitoring scheme, notably Canada and Egyptian goose.
- In Flanders, counts of wintering waterfowl are conducted 6 times every winter; during these counts, non-native waterfowl species, including IAS, are also counted. These counts are organized by the Research Institute for Nature and Forest. The international coordination of these counts is in the hands of Wetlands International.
- Through the monitoring and inventory of fish occurring in the Flemish inland waters, alien fish species are also being monitored.
- Invasive bryophytes, their spread in Belgium and impact on the indigenous bryophytes , 1990-2010, National Botanical Garden of Belgium.
- Gathering of data on the current introduction and spread of alien species (e.g. C4-grasses (e.g. *Setaria macrocarpa*, *S. verticilliformis*, *Panicum dichotomiflorum*)), especially in and along maize fields in the area between Ghent and Bruges is being done by the National Botanical Garden of Belgium.
- Dispersion of several IAS populations encountered in Brussels is monitored in the framework of a study on the Brussels biodiversity.
- In Brussels Capital Region, special attention is given to exotic species in the monitoring program on flora and fauna. Particular interest is given and several detailed studies have been made on some exotic birds (*Alopochen aegyptiacus*, *Branta canadensis*, *Psittacula krameri*, *Psittacula eupatria*, *Myiopsitta monachus*), exotic herpetofauna species (*Rana ridibunda*), some mammals (*Tamias sibericus*). Also the extension of exotic plant species is particularly followed.
- A study is ongoing in the Walloon Region on how to manage invasive alien plant species along waterways: how to prevent their expansion, how to control them, and on the different possibilities for the administration to implement these tasks and to communicate the information to local and regional administrations.
- In January 2011, the research project 'MEMO: *Mnemiopsis* Ecology and Modeling: Observation of an invasive comb jelly in the North Sea' started. The MEMO project, framed in Interreg IV A '2 Seas', is a cross-border cooperation between ILVO (Institute for agricultural and fisheries research, Belgium), IFREMER (Institut français de recherche pour l'exploitation de la mer, France), ULCO-LOG (Université du Littoral Côte d'Opale-Laboratoire d'Océanologie et de Géosciences, France), CEFAS (Centre for Environment, Fisheries and Aquaculture Science, Great-Britain) and Deltares (the Netherlands)
- March 2013, a research programme on management of American bullfrog was launched in Flanders, performed by the Research Institute for Nature and Forest (INBO) and funded by the Agency for Nature and Forest.
- Invasive alien fish species in Flanders are monitored through standardised samplings and research on their spread, impact and invasion history is conducted at the Research Institute for Nature and Forest (INBO).

- The VLIZ Alien Species Consortium (a.o. VLIZ, INBO, KBIN-BMM, ILVO, Institute for Agricultural and Fisheries Research ILVO, Ghent University, Belgian Coastal Study Group) published a Checklist for aquatic alien species in the Belgian part of the North Sea and adjacent estuaries (VLIZ special publication 59).

WEB SITES:

Invasive alien species in Belgium (Harmonia)

Information and list system of IAS in Belgium, incl. species fact sheets and results of risk assessment.
<http://ias.biodiversity.be>

Manual of the Alien Plants in Belgium

Catalogue and description of casual and established neophytes in Belgium
<http://alienplantsbelgium.be/>

Invasive ornamental plants in Belgium

AlterIAS Life+ communication project (incl. species fact sheets and code of conduct).
<http://www.alterias.be>

Invasive marine species in Belgium

List of invasive marine species in Belgium, incl. species fact sheets.
<http://www.mumm.ac.be/FR/Management/Nature/ExoticSpecies/index.php>
http://www.vliz.be/NL/Cijfers_Beleid/Niet_inheemse

INTERREG projects

INVEXO: <http://www.invexo.be>
LUTANUIS: <http://www.lutanuis.euro.st/>
RINSE : <http://www.rinse-europe.eu/>
LUPIN : concerning actions on invasive waterplants
CARTORA : <http://www.cartora.eu>

Regional/federal administrations

Brussels:
<http://www.leefmilieubrussel.be>
<http://www.bruxellesenvironnement.be>
<http://www.bruxellesenvironnement.be/Templates/Particuliers/Niveau2.aspx?id=4576&langtype=2060>
Flanders: http://www.ecopedia.be/inleiding_exoten (incl. species fact sheets)
Wallonia: <http://biodiversite.wallonie.be/invasives> (incl. species fact sheets, preventive measures, species action plans, on-line surveys, etc.)
Federal : www.health.fgov.be (environment/biodiversity/concept and actions/invasive species)

BULGARIA / BULGARIE

INFORMATION ON THE ACTIONS RELEVANT TO INVASIVE ALIEN SPECIES IN BULGARIA

General Information

The Bulgarian National Strategy for conservation of Biological Diversity identifies invasive and newly introduced alien species as one of the main threats to biological diversity in the country.

Bulgarian legislation defines the Ministry of Environment and Water (MOEW) as the principle institution responsible for formulation of policy to the alien and invasive species. MOEW works in close co-operation with Ministry of agriculture and food, Forest Agency, scientific institutions and NGOs.

The institutions coordinate their actions regarding the species used in aquaculture or for reforestation. For those purposes species used should not be invasive or potentially invasive.

Bulgaria actively participates in the international efforts, within the European Union and as part of the international treaties, to limit the negative impact of invasive species.

At the same time our country applies some special measures regarding the invasive species with negative economic impact. They are related to the investigation of biology and ecology of those species, their natural enemies, methods and means to reduce their populations and to limit their negative impact. Examples for such species are *Dreissena polymorpha*, *Rapana tomasiana*, *Cameraria ochridella*, etc. Measures to limit the spread of invasive plant species are taken in some sensitive areas along Danube River, Black Sea coast and in some protected areas.

The principle scientific institutions involved in work on invasive species are the Institute of Biological Diversity and Ecosystem Studies- Bulgarian Academy of Science (BAS), National Natural History Museum- BAS, Institute of Oceanology and Institute of Fish Resources in Varna, Forestry University and Sofia University.

The first contemporary assessment on alien and invasive species in Bulgaria was carried out in the period 2004-2007. MOEW financed and implemented two projects to estimate the alien plant, animal and fungal species in Bulgarian nature and their impact on native species and habitats which initiated the focused current activities coordinated by MOEW in that area.

As a result of the above projects, lists of invasive or potentially invasive animals, plants and fungi was created, information was obtained on the ways for their introduction on the territory of Bulgaria, their impact on country's nature, as well as recommendation were made on limitation and elimination (when possible) of their impact. The estimates show that the impact of invasive alien species is similar to the one observed in Continental Europe; aquatic ecosystems being most sensitive and threatened, where the spread of new species is fastest.

Over 20 projects carried out by different Bulgarian scientific institutions are currently under way or have been finalized in the last few years resulting in tens of reports and publications (See [Annex 1](#) for some of the projects). The topics include different aspects related to IAS, including: new species of Bulgarian flora, fauna and mycota; studies on the biology, ecology and spread of IAS; IAS in forests; natural enemies on IAS; problems caused by IAS in Bulgaria; alien Lepidoptera species; alien species in ornamental plants; IAS and climate change; effects of IAS - on ecosystems, economic stability, human health, forests; methods of control on IAS. A number of meetings, scientific forums and conferences on IAS were organized.

Summary information on invasive alien species in Bulgaria is presented in the national report on the state of the environment on the Internet site: <http://eea.government.bg/bg/soer/2010/biodiversity-nem/biologichno-raznoobrazie-natsionalna-ekologichna-mrezha-1>

Fig. 1. Cumulative number of alien species in terrestrial ecosystems:

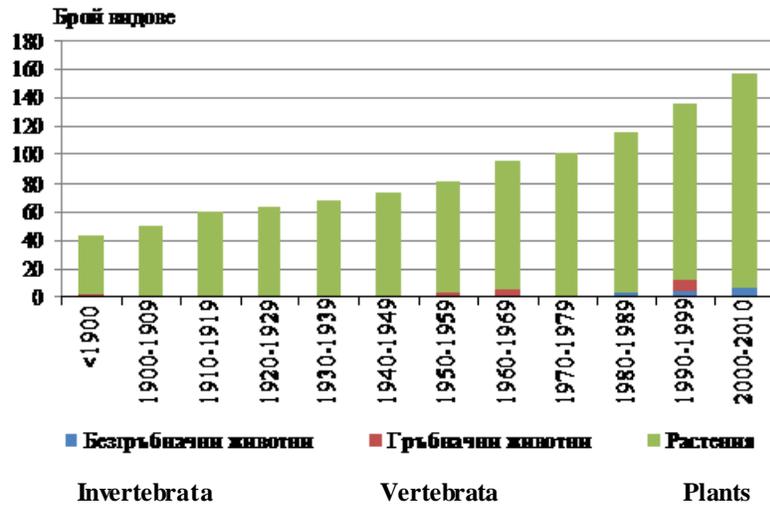


Fig. 2. Cumulative number of alien animal species in terrestrial ecosystems:

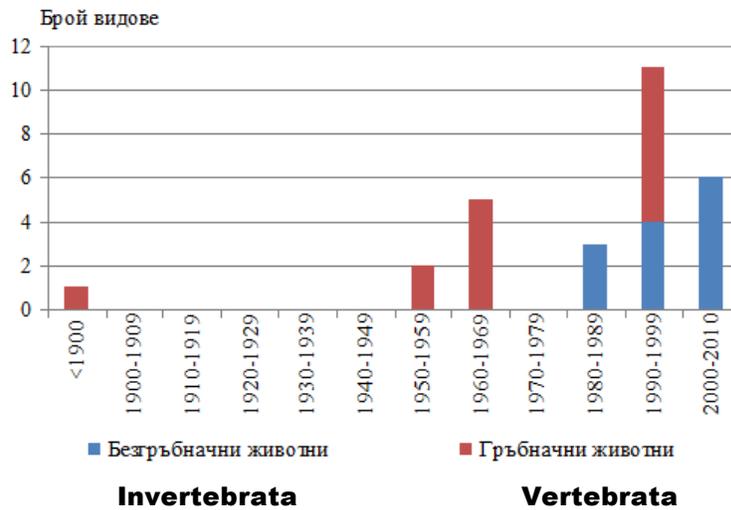


Fig. 3. Cumulative number of alien animal species in fresh water ecosystems:

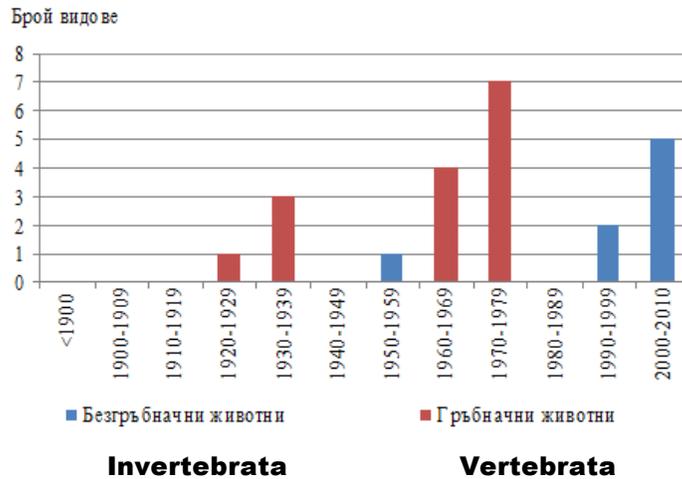
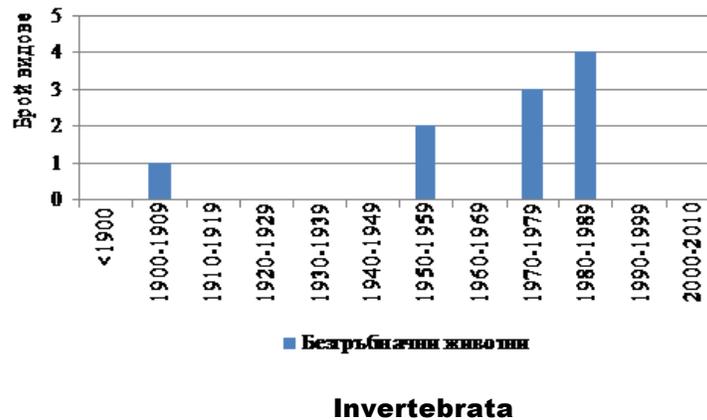


Fig. 4. Cumulative number of alien invertebrata species in marine ecosystems:



The cooperation between MOEW and scientific teams working in the area of invasive species is very good. Bulgarian scientists and other experts participate in working groups on European and global level providing information to specialized databases (DAISIE, CABI) or undertaking specific tasks such as risk assessment, assessment of species with highest invasive potential, development strategic and legislative documents for EU, measures to limit the transfer of invasive species used as pets, in aquariums, as live bait, etc.

In summary, Bulgarian policy on invasive species aims principally prevention and cooperation because early detection and countermeasures have higher chances of success and are more cost effective.

EU Regulation 1143/2014 on Invasive Alien Species

In 2013 and 2014, Bulgaria participates in the preparation of EU Regulation 1143/2014 on Invasive Alien Species entered into force on 1 January 2015. The Regulation seeks to address the problem of invasive alien species in a comprehensive manner so as to protect native biodiversity and ecosystem services, as well as to minimize and mitigate the human health or economic impacts that these species can have. The regulation foresees the following interventions: prevention, early detection, rapid eradication and management. Scientific and technical experts also participate in the the process of preparation of the list of invasive alien species of Union concern based on a risk assessments and scientific evidence.

Regional Cooperation

East and South European Network for Invasive Alien Species

The East and South European Network for Invasive Alien Species (ESENIAS) has been initiated and created in 2011 at Sofia, with the participation of all the countries in the region and the support of the European Environmental Agency and IUCN (<http://www.esenias.org>).

ESENIAS is a regional data portal for the exchange of information on invasive species and early warning, with center in Bulgaria. The portal will be managed by the Bulgarian Academy of Sciences in cooperation with the Ministry of Environment and Water. Its aim is to facilitating access to and exchange of information relating to the identification, risk assessment, management, monitoring and control of invasive species, and also providing the methodological support (legislation, guidance, scientific references) related to IAS in the region. A number of activities are organized by the ESENIAS network including international conferences, meetings, workshops and training courses linked to IAS:

- 40 Internationale Assotiation for Danube Research Conference, June 2014, Sofia, Bulgaria
http://www.esenias.org/index.php?option=com_content&task=view&id=349

- Danube Region IAS Network Meeting, Octobre 2014, Sofia, Bulgaria)
http://www.esenias.org/index.php?option=com_content&task=view&id=365
- NEOBIOTA 8 Internationale IAS Conference, November 2014, Antalia, Turkey - co-organized by ESENIAS
http://www.esenias.org/index.php?option=com_content&view=article&id=362.news-24&catid=52:esenias-news&Itemid=125
- 4 ESENIAS Internationale Workshop on IAS in Agricultural and Non Agricultural Areas, Decembre 2013, Turkey
http://www.esenias.org/index.php?option=com_content&view=article&id=353.news-21&catid=52:esenias-news&Itemid=125
- 3 ESENIAS Internationale Workshop on IAS - 2012 Serbia,
- Training course - List of IAS plant in Balkan Region, Serbia, 8-11 Jule 2013

Future Steps

In order to reduce and prevent the negative effect of alien and invasive species on nature, human health and economy, MOEW aims to create conditions for implementation of the policy in the area by:

1. Implementation of Regulation (EU) No 1143/2014 concerning species included in the list of invasive alien species of Union concern – activities related to assessment of the situation in Bulgaria; preparation of action plans on the pathways control; taking measures to eradicate or managed the IAS etc.
2. Providing opportunities for financing of projects related to invasive species from Operational Program Environment 2014-2020;
3. Development the scientific base, regional cooperation and improving public awareness on IAS.

Ministry of Environment and Water is grateful to Assoc.Prof Ana Petrova, PhD (IBER, BAS); Prof. Rumen Tomov, PHD (Forestry University, Sofia); Chief Assist. Teodora Trichkova (IBER, BAS); Chief Assist. Vladimir Vladimirov (IBER, BAS) for the information provided in preparation of this report.

May, 2015

Prepared by: Rayna Hardalova, Ministry of Environment and Water

Annex 1.**A. New alien species of vascular plants reported for the country in the past 6 years (2009-2014)****1. Asclepiadaceae**

1. *Vincetoxicum nigrum* (L.) Moench (Petrova 2010) (SW Europe)

2. Asteraceae

2. *Bidens bipinnatus* L. (Petrova & Vladimirov 2009) (N America)
3. *Bidens vulgatus* Greene (Petrova & Vladimirov 2009) (N America)
4. *Erigeron sumatrensis* Retz. (Vladimirov 2009) (N America)
5. *Grindelia squarrosa* (Pursh) Dunal (Владимиров 2012; Vladimirov & Petrova in press) (N America)
6. *Senecio inaequidens* DC. (Vladimirov & Petrova 2009a) (S Africa)
7. *Silphium perfoliatum* L. (Vladimirov & Petrova 2010) (N America)

3. Balsaminaceae

8. *Impatiens balfourii* Hook. f. (Adamowski 2009) (Asia)

4. Caprifoliaceae

9. *Symphoricarpos albus* S.F. Blake (Zieliński, Petrova & Natcheva 2012) (N America)

5. Chenopodiaceae

10. *Chenopodium missouriense* Aellen (Grozeva 2010) (N America)
11. *Chenopodium probstii* Aellen (Grozeva 2010) (N America)

6. Dipsacaceae

12. *Cephalaria gigantea* (Ledeb.) Bobrov (Petrova 2012) (SW Asia)

7. Euphorbiaceae

13. *Euphorbia davidii* Subils (Vladimirov & Petrova 2009b) (N America)

8. Fabaceae

14. *Laburnum anagyroides* Medik. (Vladimirov & Petrova in press) (Mediterranean)
15. *Lupinus polyphyllus* Lindl. (Vassilev & Pedashenko 2009) (N America)

9. Grossulariaceae

16. *Ribes aureum* Pursh (Zieliński & Petrova 2012) (N America)

10. Hydrocharitaceae

17. *Elodea nuttallii* (Planch.) H.St. John (Georgiev, Tzoneva, Valchev 2011) (N America)

11. Poaceae

18. *Avena byzantina* K. Koch (Petrova 2010) (SW Asia)
19. *Cenchrus incertus* M.A. Curtis (Jehlík & Scholz 2009) (N America)
20. *Panicum dichotomiflorum* Michx. (Petrova & Vladimirov 2012) (America)

21. *Pennisetum setaceum* (Forssk.) Chiov. (Velchev & Petrova 2011) (**America**)

12. Phytolaccaceae

22. *Phytolacca esculenta* Van Houtte (Zieliński, Petrova & Natcheva 2012) (**E Asia**)

13. Rosaceae

23. *Prunus serotina* Ehrh. (Zieliński, Petrova & Natcheva 2012) (**N America**)

24. *Spiraea ×pseudosalicifolia* **Silverside** (Zieliński & Petrova 2012)

14. Salicaceae

25. *Populus ×canadensis* Moench (Zieliński & Petrova 2012)

15. Vitaceae

26. *Parthenocissus inserta* (A. Kern.) Fritsch (Zieliński, Petrova & Natcheva 2012) (**N America**)

B. Main projects related to IAS:

2.1 Assessment and Management of *Dreissena* spp. Invasions in the Bulgarian Water Bodies Project DO 02-283/2008, 2009–2012, financed by the Bulgarian Science Fund, Ministry of Education, Youth and Science.

Co-ordinator: Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences; **Project Partners:** Sofia University “St. Kliment Ohridski”, NGO Ecoforum for Nature, Institute of Ecology, University of Innsbruck, Austria, Hydrobiological Institute Ohrid, FYR Macedonia, "Grigore Antipa" National Museum of Natural History, Romania, US Army Corps of Engineers, USA.

Project website: <http://www.dreissena.info>

Project Summary: The freshwater bivalve mollusc species zebra mussel *Dreissena polymorpha* and quagga mussel *Dreissena bugensis* are among the most aggressive aquatic invaders which have great potential to cause ecological and economic damages. In Bulgaria, zebra mussel originates from the Danube River and some Black Sea lakes and river estuaries, but in latest years, the species has spread rapidly into the Bulgarian inland water bodies. The reservoirs in many regions have been reported as infested and some of them have strong impact on the hydroelectric facilities connected with them. Recently, the quagga mussel was recorded in the Bulgarian stretch of the Danube River. The main goal of the present project is to assess the current state of *Dreissena* spp. invasions in Bulgaria and to develop management tools for vulnerable and already infested water basins. To achieve this goal, the following objectives are implemented: 1) study the present distribution of zebra and quagga mussels in Bulgaria and to develop GIS database of *Dreissena* invasions; 2) characterize the invasive *Dreissena* populations in infested water bodies; 3) study the impact of *Dreissena* invasions on aquatic ecosystems and water engineering facilities; 4) develop measures to limit the risk of *Dreissena* introductions; and 5) develop measures for control in infested water basins. The results of the project are important for managers and decision makers with necessary guidelines which help them to limit the risk of *Dreissena* infestations and to reduce the damages on aquatic ecosystems and industry.

2.2 Alien Terrestrial Arthropods and Their Impact on Biodiversity in Bulgaria (ATARTIB); Project DO 02-191/2008, 2009–2012, financed by the Bulgarian Science Fund, Ministry of Education, Youth and Science

Co-ordinator: University of Forestry, **Project Partners:** Bulgarian Academy of Sciences, National Center of Infectious and Parasitic Diseases, University of Shumen, CAB International, Utrecht University, Netherlands, Institute for Plant Protection, Portici, Italy

Project website: <http://www.atartib.bg/>

Project Summary: The main objectives of the project are: Accurate inventory of alien arthropods in Bulgaria filling the gaps in knowledge concerning alien arthropods in Bulgaria detected in framework of DAISIE and SCOPES projects; Study the ecological impact of selected alien species and the mechanisms underlying this impact extending the activities of ALARM project in Bulgaria; Assessing the role of natural enemies in the invasion success of alien species, using some case studies; Assessing the role of alien arthropods on mammals and birds as vectors of diseases. The results of the project include: 1) Validation of list of alien arthropods in Bulgaria in framework of SCOPES and DAISIE projects; Assessment of the population status of species excluded from previous analysis of alien species; Creation of alien ectoparasites list; Eleven species are reported as new for the fauna of Bulgaria since they are reported in neighbour countries; Development of tools for early detection of alien species present in neighbour countries; About 40 new species for Bulgarian fauna are described and the new data obtained are integrated into the data bases of DAISIE and SCOPES projects; Assessment of ecological effect due to some herbivores. The results are complementary to the European project ALARM; Contribution are made to the knowledge of the epizootological importance of the terrestrial arthropods as a possible vectors of infections in mammals and birds, as well as of multiresistant microbial strains; Conduction of study on the ecological impact *Harmonia axyridis*; Creation of distribution map of the most ecologically important alien arthropod species in Bulgaria; Analyses are made of most likely pathways of invasion, ecosystem invasibility and species traits that make a species prone to invasion; Increasing of public awareness about non-indigenous arthropods in Bulgaria are made.

2.3 Potential threats to environmental and economic sustainability in the Danube and Black Sea region: Danube River as invasive alien species corridor, 2012–2015, financed by the International Association for Danube Research (IAD) and ESENIAS.

Co-ordinator: Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences;

Project partners: IAD and ESENIAS countries

Project Summary: The main objective of the project is to analyze the role of invasive alien species in the Danube and Black Sea region. Activities: Drawing up a list of IAS in the Danube River based on existing monitoring data; Research on invasive populations - pathways, qualitative and quantitative composition, biological and ecological characteristics, depending on environmental factors; Study of the potential impacts on native species and ecosystems; Risk assessment by adapting existing or develop new approaches; Proposals for management methods that can contribute to sustainable development in the Danube basin.

2.4 Climate Change and Invasive Alien Species – growing threats to biodiversity and ecosystem functions in ancient Lake Ohrid and its watershed, 2012-2014, financed by the Royal Norwegian Embassy – Skopje/ Belgrade.

Co-ordinator: Hydrobiological Institute Ohrid, FYR Macedonia/ From Bulgarian side: IBER-BAS;

Project partners: IBER-BAS, Bulgaria, and the Agricultural University of Tirana, Albania

Project summary: The main project goal is to study/ identify the impact posed by Climate change and IAS to biodiversity and ecosystem services in Ohrid Lake and its watershed and to formulate preventive measures and action plans. Work packages: Changes in the biological communities in Ohrid Lake watershed as a result of Climate change and introduction of IAS; Environmental changes in Ohrid Lake watershed as a result of Climate change and introduction of IAS; Development of measures to prevent and mitigate the impact of Climate change and IAS on endemic flora and fauna; Analyzing of data and results received and formulation of corresponding measures for impact prevention and mitigation; Awareness raising.

2.5 COST Action - European Information System for Alien Species (TD1209), 2012–2016, financed by EC.

Project website: http://www.cost.eu/domains_actions/fa/Actions/TD1209

Project Summary: The main objectives of the project are to Identify needs and formats for an Early Warning and Rapid Response System; Review of pathways of introduction of Invasive Alien Species (IAS), analysis of priority species for rapid response, aligning with relevant legislation; Review IAS impacts in Europe and impact assessment methods, propose standardised assessment methods and assess present and expected impacts of priority IAS; Explore existing data gaps in harmonisation and validation of information distributed in available sources in order to increase interoperability of data across the terrestrial, freshwater and marine environments. Identify needs and formats for alien species information by different user groups.

2.6 Reducing the negative impact of invasive species and restore natural habitat by planting native species in Srebarna Managed Reserve, 2012-2014, financed by the Operational Programme Environment 2007-2013; Beneficiorer: Regional Inspectorate of Environment and water – Russe.

Project website: <http://www.riosv-ruse.org/proekti-i-finansirane/proekti-na-riosv.html> The project includes activities in the territory Srebarna Managed Reserves " (UNESCO natural heritage site) associated with removal of invasive (*Amorpha fruticosa*, *Ailanthus altissima*, *Acer negundo*, *Fraxinus pensilvanica*) and non-native species (*Populus deltoids*), reducing their negative impact on local populations and restoration of habitats European importance: 91 EC * Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Pandion, Alnion incanae, Salicion albae), 6250 "Pannonian loess steppe grasslands" and species habitat code 3150 "Natural eutrophic lakes with vegetation type Magnopotamion or Hydrocharition".

2.7 Biology, Ecology and Control of the Invasive Alien Species in the Bulgarian flora (DO 02-194), 2009-2012, financed by the National Science Fund of the Ministry of Education, Youth and Science of the Republic of Bulgaria

Project website: <http://alienplants.bio.bas.bg/alienplantsbg>

Project Summary: The project aims at studying the distribution patterns, biology, ecology and pathways of introduction and spread of the invasive alien species in the Bulgarian flora in order to contribute to mitigation of their negative impact on the native species and ecosystems. The following results have been obtained: 1) **28** species of vascular plants from 15 families have been recorded for the first time on the territory of the country. Information has been collected about their origin, biology, distribution and impact on the native biodiversity, national economy and human health. Of these species 11 have been assessed as invasive or potentially invasive. For the remaining species more observations are needed in order to assess their invasive status; 2) **60** species of vascular plants have been assessed as invasive or potentially invasive (included in a special book – see the list below), of which 10 species are classified as “worst invasive” (“top 10”) – *Acer negundo*, *Ailanthus altissima*, *Ambrosia artemisiifolia*, *Amorpha fruticosa*, *Bidens frondosus*, *Elodea nuttallii*, *Fallopia ×bohemica*, *Opuntia humifusa*, *Paspalum distichum*, *Robinia pseudoacacia*); 3) More than 1000 new localities of the alien species of vascular plants in the country have been gathered and located by a GPS-device; a book is published on IAS Plant Species in Bulgaria.

List of the invasive and potentially invasive species (included in the book):

http://www.esenias.org/index.php?option=com_content&view=article&id=364:news-26&catid=52:esenias-news&Itemid=125

| | | |
|-----------------------------------|-----------------------------------|--|
| 1. <i>Acer negundo</i> | 21. <i>Elaeagnus angustifolia</i> | 41. <i>Laburnum anagyroides</i> |
| 2. <i>Ailanthus altissima</i> | 22. <i>Elodea canadensis</i> | 42. <i>Lycium barbarum</i> |
| 3. <i>Amaranthus albus</i> | 23. <i>Elodea nuttallii</i> | 43. <i>Matricaria discoidea</i> |
| 4. <i>Amaranthus hybridus</i> | 24. <i>Erigeron annuus</i> | 44. <i>Oenothera biennis</i> |
| 5. <i>Amaranthus retroflexus</i> | 25. <i>Erigeron bonariensis</i> | 45. <i>Opuntia humifusa</i> |
| 6. <i>Ambrosia artemisiifolia</i> | 26. <i>Erigeron canadensis</i> | 46. <i>Oxalis corniculata</i> |
| 7. <i>Amorpha fruticosa</i> | 27. <i>Erigeron sumatrensis</i> | 47. <i>Panicum capillare</i> |
| 8. <i>Asclepias syriaca</i> | 28. <i>Euphorbia davidii</i> | 48. <i>Panicum dichotomiflorum</i> |
| 9. <i>Bidens bipinnatus</i> | 29. <i>Euphorbia maculata</i> | 49. <i>Parthenocissus inserta</i> |
| 10. <i>Bidens frondosus</i> | 30. <i>Fallopia ×bohemica</i> | 50. <i>Parthenocissus quinquefolia</i> |

| | | |
|-------------------------------------|------------------------------------|---|
| 11. <i>Bidens vulgatus</i> | 31. <i>Galinsoga parviflora</i> | 51. <i>Paspalum distichum</i> |
| 12. <i>Broussonetia papyrifera</i> | 32. <i>Galinsoga quadriradiata</i> | 52. <i>Phytolacca americana</i> |
| 13. <i>Buddleja davidii</i> | 33. <i>Gleditschia triacanthos</i> | 53. <i>Robinia pseudoacacia</i> |
| 14. <i>Cenchrus incertus</i> | 34. <i>Grindelia squarrosa</i> | 54. <i>Senecio inaequidens</i> |
| 15. <i>Chenopodium ambrosioides</i> | 35. <i>Helianthus tuberosus</i> | 55. <i>Sicyos angulatus</i> |
| 16. <i>Chenopodium pumilio</i> | 36. <i>Impatiens glandulifera</i> | 56. <i>Solidago gigantea</i> |
| 17. <i>Cuscuta campestris</i> | 37. <i>Impatiens parviflora</i> | 57. <i>Sorghum halepense</i> |
| 18. <i>Datura stramonium</i> | 38. <i>Iva xanthiifolia</i> | 58. <i>Symphotrichum novi-belgii</i> agg. |
| 19. <i>Echinocystis lobata</i> | 39. <i>Juncus tenuis</i> | 59. <i>Xanthium italicum</i> |
| 20. <i>Eclipta prostrata</i> | 40. <i>Koelreuteria paniculata</i> | 60. <i>Xanthium spinosum</i> |

2.8 The Programme: Biodiversity and Ecosystem Services (BIO) 2009-2014 funded by EEA and Norwegian Financial Mechanisms 2009 – 2014 foresees activities connected with: Development of common methodological approaches to data collection and monitoring of IAS, assessing the risk to and impact on native biodiversity and prioritizing response actions; Creation of an IAS information system to support stakeholders decision-making and actions, and awareness raising on IAS. One of Programme aims is to upgrade the National Biodiversity Monitoring System with a module related to IAS and the development of a common IAS information portal in Bulgaria, compatible with the National Biodiversity Monitoring System. Regional cooperation and involvement of countries with similar bio-geographic regions is crucial and collaboration with existing regional networks will be developed. Thus collected and analyzed data can be used for application of Regulation 1143/2014 and for undertaking systematic activities to prevent their introduction and limiting their spread: <http://www.moew.government.bg/?show=124>.

2.9 Ecosystem consequences of biodiversity change due to fish species invasions, 2014-2016, Funded by the Bulgarian Academy of Sciences and the Academy of Sciences of the Czech Republic, in collaboration with the Institute of Vertebrate Biology, ASCR.

CROATIA / CROATIE

REPORT TO THE BERN CONVENTION GROUP OF EXPERTS ON INVASIVE ALIEN SPECIES

Report period: 2013 - 2014

During the report period 2013 – 2014, the Republic of Croatia carried out several projects and activities regarding invasive alien species, specifically related to the following issues:

STRENGTHENING NATIONAL POLICY, LEGAL AND INSTITUTIONAL FRAMEWORKS

On July 1, 2013, the Republic of Croatia became the 28th member of the European Union (EU). At the time of accession, Croatian legislation was fully aligned with the EU-acquis in the field of nature conservation and protection. Consequently, the new *Nature Protection Act* (Official Gazette No. 80/2013) came into force in July 2013, and among other issues, it regulates market placement, introduction into the nature, as well as breeding of alien species on the national level.

In addition, in July 2013, the new *Act on transboundary movement and trade in wild species* (Official Gazette No. 94/2013) came into force, which implemented into national legislation a set of Regulations known as the EU Wildlife Trade Regulations, and which prescribed the necessary enforcement and misdemeanor provisions of the Regulations.

During 2014 the Ministry of Environmental and Nature Protection (MENP) set up an Inter-Ministerial Task Force aiming to develop comprehensive national legislative and strategic framework for alien and invasive alien species. The framework should establish legislative requirements and standards for the development of national mechanisms for prevention, detection, control, eradication and management of invasive alien species. The Task Force has started drafting a new bill on prevention of the introduction and spread of alien and invasive alien species and their management, that will ensure the implementation of the *Regulation (EU) No 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species* (OJ L 317, 4.11.2014). Furthermore, the bill should also regulate the introduction of alien species into Croatia, their marketing, breeding and intentional release into nature, as well as risk assessment protocols for prediction of their invasiveness. It should establish a national list of invasive alien species of Croatian concern with related restrictions and control measures, and it should also define a detailed invasive alien species management system, including early detection and rapid response system. Additionally, the competent authorities and their tasks should be determined, together with inspection services for official controls. Finally, the legal framework for effective interagency coordination should be prescribed as well as adequate misdemeanor provisions.

During 2013 and 2014, the MENP had conducted, as part of the EU Natura 2000 Integration Project – NIP, several training modules aiming to build capacity for implementation of the national and EU legislation regarding the transboundary movement and trade in wild species, as well as in alien and invasive alien species. Particular efforts were paid to strengthening cooperation between the institutions and officials responsible for enforcing the established rules. Within this module, 11 seminars were held including a total of 267 officials of state bodies, mainly customs officers, border veterinary and phytosanitary inspectors and nature protection inspectors.

COLLECTING, MANAGING AND SHARING INFORMATION & PUBLIC AWARENESS

Since 2013, the State Institute for Nature Protection (SINP) has carried out a project entitled *Development of measures for prevention, early detection and rapid response for alien species – the pilot project of signal crayfish expansion control and eradication from the river Korana*. The project included the following activities:

- Controlling the spread of signal crayfish in the Korana River during 2013 – 2014
- 2013 public opinion research in Croatia was conducted on a sample of 1000 respondents regarding their knowledge on the problems of invasive alien species. The aim of this study was to determine the level of education and public awareness in Croatia on invasive species with special emphasis on exotic pets as one of very important pathways
- During 2014, the Berne Convention's codes of conduct on invasive alien species and botanical gardens, recreational fishing, pets, hunting, as well as Zoos and aquariums were translated into Croatian
- Two picture books and two posters aimed primarily at children in preschool and early elementary school were printed, as well as a code of conduct poster intended for people of all ages
- In November 2014, Croatian experts and scientists gathered at the workshop on risk assessment, where standardized protocol for risk assessment on turtles and 16 particular risk assessments were designed
- Since two invasive alien species were recorded in Croatia, the Asian citrus long-horned beetle (*Anoplophora chinensis*) in Zadar County and the giant hogweed (*Heracleum mantegazzianum*) in Krapinsko – zagorska County, rapid coordinated actions were carried out aiming at full control and eradication of these species.

As part of the educational campaigns and raising public awareness on invasive alien species and their adverse effects on biodiversity, economy and human health, SINP and MENP organized in Zagreb, on 11 June 2014, a workshop *Exotic pets in the context of potentially invasive species*. The aim of the workshop was to bring together a group of stakeholders involved in the import and marketing of the live specimens of exotic species of flora and fauna, in order to acquaint them with the EU and Croatian regulations on alien and invasive alien species, to represent the scientific and technical aspects of the issue, to raise awareness of invasive alien species and to establish better cooperation between the competent authorities and other stakeholders.

On 11 November 2014, the Croatian Ecological Society organized, in cooperation with the SINP and Public Institution for management of protected areas of the City of Zagreb Maksimir, the first Croatian symposium on invasive species (<http://www.ekolosko-drustvo.hr/1HSIV-Book-of-abstracts.pdf>). Considering the fact that the aim of the symposium was to develop a systematic and interdisciplinary approach to the issue of invasive species, the symposium brought together scientists and experts who deal with different issues such as the marine ecosystem, inland water and land, different types of flora and fauna. During the symposium, a new book *Flora Hrvatske – Invazivne vrste* by Toni Nikolić, Božena Mitić, Igor Boršić was presented.

REGIONAL CO-OPERATION

Croatia, as a member of the ESENIAS network (*South and East European Network on Invasive Alien Species*), participated in the 4th meeting of the ESENIAS international workshop *IAS in Agricultural and Non-Agricultural Areas in ESENIAS Region*, held on 16-17 December 2013 in Çanakkale, Turkey, as well as in the preparation of a regional project *ESENIAS-Tools*.

Croatia has actively participated in the launch of a new regional initiative *Danube Region Invasive Alien Species Network (DIAS)*.

Croatia took part in a regional workshop *Capacity-building Workshop to Address Invasive Alien Species and to Achieve Aichi Biodiversity Target 9 in the Central and Eastern Europe and Central Asia*, held on 9-12 December 2013 in Sarajevo, Bosnia and Herzegovina, which was organized by the Secretariat of the Convention on Biological Diversity (CBD) for 31 invited countries of the region, in order to develop national strategies and action plans on invasive alien species.

CZECH REPUBLIC / RÉPUBLIQUE TCHÈQUE

THE CZECH REPUBLIC

In 2014, the Nature Conservation Agency of the Czech Republic (NCA CR) launched a webpage on invasive alien species (IAS, <http://invaznidruhy.nature.cz>) which provides up-to-date information on IAS in the Czech Republic, including current legislation, description of the most important invasive alien plants and animals as well as information on IAS prevention, elimination and eradication projects and on the most effective IAS control and regulation methods and techniques. It also links to key publications on IAS as well as to institutions dealing with the issue. Through an early warning system presented on this webpage, everyone could be involved in IAS mapping in the Czech Republic and thus, contribute to protecting nature and the landscape from IAS introduction and spread (GÖRNER 2014).

In 2014, the Ministry of the Environment of the Czech Republic published the 5th National Report of the Czech Republic to the Convention on Biological Diversity. A part of the document deals with IAS (PLESNÍK 2014):

Geographic position, development of human settlements and progressing globalisation have significantly strengthen the spread of invasive alien species, *i.e.* species whose introduction and/or spread outside their natural past or present distribution threatens biological diversity, namely other species, habitats or even whole ecosystems and their processes, in the Czech Republic. Although there is no official list of invasive alien species or non-native/alien species, which may become invasive, there have been published lists of non-native species of wild plants and animals (*i.e.*, blacklists) in the Czech Republic (ŠEFROVÁ & LAŠTŮVKA 2005, PYŠEK *et al.* 2012).

According to the latest data, non-native species account for 36.2% of vascular plant taxa in the Czech Republic and 90 of them are invasive. (ZEDEK *et al.* 2010., DANIHELKA 2013). More than one third (34.6 %) of non-native vascular plant species in the Czech Republic originate from the Mediterranean and almost one fifth (19.4 %) from other parts of Europe (PYŠEK *et al.* 2012). Concerning wild animals, the proportion of non-native vertebrates in the Czech Republic is 10.2 % (PLESNÍK & STAŇKOVÁ 2001). Out of 595 non-native species of wild animals, both vertebrates and invertebrates, 113 are considered as invasive species (ŠEFROVÁ & LAŠTŮVKA *l.c.*). For more details on the most important non-native species in the Czech Republic, see MLÍKOVSKÝ & STÝBLO (2004).

While the number of introduced invertebrate species in the Czech Republic has been increasing since the late 19th century, in mammals and plants a lot of the invasive alien species had been introduced intentionally or accidentally already prior to 1900 (ZEDEK *et al.l.c.*). Distribution maps show the evidence that non-native vascular plant species are most common and widespread in agricultural lowlands and in urban areas, at sites with sandy soil in lowlands and along rivers, whereas they are much less common in mountain areas. In medium altitudes the non-native wild plants occur more frequently in the agricultural landscape/farmland than in forest ecosystems (CHYTRÝ *et al.* 2005, 2009). As far as habitats are concerned, the highest numbers of non-native species have been reported on arable land, in annual synanthropic vegetation, anthropogenic tall-forb stands and trampled sites, where the average proportion of archaeophytes is 18 – 56%, that of neophytes 4.2 – 9.5% respectively (PYŠEK *et al.* 2003b, CHYTRÝ *et al.* 2005).

A survey in 302 Specially Protected Areas of the Czech Republic shows that vascular plant alien number depends from altitude, protected vegetation type, relationship to the native species and intensity of the penetration of the propagating species defined by the population density in the region. Since natural vegetation is an effective barrier against the establishment of alien species including invasive ones, the early protected areas harbour less non-native plant species. Thus, on a historical time scale, the early

establishment of nature reserves in a given country decreases the probability that the reserve will be invaded by alien plants. (PYSEK *et al.* 2002, 2003a, *cf.* HULME *et al.* 2013, PYSEK *et al.* 2013).

At present, the National Strategy on Invasive Alien Species in the Czech Republic has been under preparation. It will be based on the approaches having been applied in the Convention on Biological Diversity, the Council of Europe or the Bern Convention (GENOVESI & SHINE 2004, CBD 2015), and on the current EU legislation. The Czech Republic does not have any special legislation on invasive alien species: the issue is treated with a plenty of laws, decrees and other legal measures. Since both intentional and accidental introduction proportion is similar in all basic taxa or ecological/functional groups, except invertebrates, and due the present rate of international trade and adopted phytosanitary and veterinary measures the current trend in the rate of invasive alien species introductions is supposed to continue in the near future (ZEDEK *et al.*, MARKOVÁ & HEJDA 2011, PLESNÍK 2011). According to generally accepted and respected robust scenarios, the current and projected climate change shall also significantly contribute to the trend (PLESNÍK 2009, WALTHER *et al.* 2009, EEA 2012, BELLARD *et al.* 2013, STDF 2013).

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Prepared by Jan Plesník, Nature Conservation Agency of the Czech Republic Prague

ESTONIA / ESTONIE

NATIONAL REPORT OF ESTONIA ON THE BERN CONVENTION INVASIVE ALIEN SPECIES

Authority concerned:

Ministry of the Environment
Nature Conservation Department
Narva mnt 7a
Tallinn
Estonia

Overview

Estonia is a relatively small country with the area of 45,227 km² (out of which 4,45% is water) and with low population density (29/km²). Abundance of various habitats creates preconditions for high diversity in species. The total number of species known in Estonia is 26,600, but it is expected that Estonia has up to 45,000 species. Due to the geographical position of Estonia, many species live here on the border of their range, which gives Estonia its' unique biological diversity. To preserve biodiversity and ensure favourable conservation status of endangered species and habitats, 18% of the Estonian land and 31% of the water areas are under protection.

The major hazards for the species are loss and fragmentation of suitable habitats, including loss of migratory routes. Also changes in land use affect species typical for semi-natural habitats. Also the increase of alien species affects our biodiversity negatively.

982 alien species have been found in Estonian nature, but as there are no dedicated surveys in terrestrial and freshwater habitats, the real number is expected to be higher.

Collecting, managing and sharing information

There is an ongoing information technology (IT) project to update the official nature conservation database to be more suited to process and store alien species information. We have also been exploring the citizen science side of reporting on all species, but with most focus on protected and alien species, the database is located here: <http://loodus.keskkonnainfo.ee/iva/>. The database also has map view of the your own and other public records (species in first and second protection category are not shown). There is also open land info portal where all alien hogweed colonies are mapped and regularly updated (link <http://xgis.maaamet.ee/xGIS/XGis> and selection "Karuputke tõrjumise ja loodushoiutööde kaardirakendus" or [direct link](#)). There are also alien species information pages on Ministry of Environment and Environmental Board homepages. More comprehensive dedicated alien species portal is foreseen in near future for awareness raising and information sharing.

For information gathering there is annual dedicated marine survey program for our biggest harbour in co-operation with the Estonian Marine Institute, University of Tartu. Terrestrial and fresh water alien species surveys are to be integrated to existing species and habitats surveys for the new EU regulation 1143/2014.

For the international information sharing there have been alien species meetings with Latvia and Finland and in January 2015 Estonia also hosted the NOBANIS portal meeting in Tallinn.

The most up to date Estonian alien species information is presented on the NOBANIS portal <http://www.nobanis.org/>

Legislation and Strategic Documents

According to Nature Conservation Act release of alien species to wild nature is prohibited. The only exception is list of 13 alien tree species allowed to be used in forestry and these aliens tree plantations cover less than 0,5% of Estonian forest land.

In Estonia there is also a legally binding “black list” of 43 species likely to disrupt natural balance, live specimens of which shall not be brought into Estonia and transactions with and rearing of live specimens of these species are not allowed. There are two types of exceptions for species on this list. Firstly it is possible to get a licence for mink or raccoon dog farm (both species are on the list), if the farm meets the requirements set by regulation of the Minister of the Environment. Six such licenses have been granted since the black list was adopted in 2004, three of them within last 2 years. Licensed farms have also possibility to import new animals for gene pool renewal, the number of imported animals in two years can be up to 20% of breeding stock set on the licence. Also it is possible to get exceptions for scientific work, but no permissions have been granted as there have been no applications.

There is also regulation to protect Estonian nature in subspecies level from alien populations. To protect the gene pool on native species it is prohibited to relocate native animal species or release in the wild live specimens of native species brought in from other countries. It is possible to get a permission in scientifically justified cases for reintroduction.

“Estonian Environmental Strategy 2030” sets one measure on alien species: Formulation of measures to oust alien species and avoid the spread of new potentially invasive alien species.

Its’ action plan “The National Environmental Action Plan of Estonia 2007-2013” has one more concrete action: formulation and implementation of an action plan for ensuring biodiversity, incl. a conception concerning alien species

“Nature Conservation Development Plan until 2020” sets a goal to work on the prevention of introduction of invasive alien species in nature, a regulation of use, a research of alien species, a development of monitoring system, a development and application of control measures (management plans).

Estonia has not ratified the IMO International Convention for the Control and Management of Ships’ Ballast Water and Sediments, but is actively working towards this goal.

To facilitate better co-operation on alien species and legal obligations there have been dedicated training events on alien species for customs officials, environmental inspectorate (legal surveillance institution) and other nature conservation sectors.

| Heracleum eradication | |
|-----------------------|------|
| Year | ha |
| 2005 | 235 |
| 2006 | 605 |
| 2007 | 609 |
| 2008 | 867 |
| 2009 | 796 |
| 2010 | 1254 |
| 2011 | 1474 |
| 2012 | 1687 |
| 2013 | 1922 |
| 2014 | 2044 |

Rapid response, eradication and management

Main efforts in Estonia have been done on the alien **hogweed** species (*Heracleum sosnowskyi*, *H. persicum*, *H. mantegazzianum*) eradication.

Although hogweeds have been introduced long time ago, first known reports are from 1777 *H. persicum*, 1814 *H. mantegazzianum* and *lehmannianum*, 1957 *H. sosnowskyi* and *pubescens*, the propagule pressure was highest in 1960s until 1980s when the plant was sown in high numbers for silage, and was popular as ornamental and honey plant.

Eradication works have been based on management plans which have been adopted for years 2005-2010 and 2011-2015. Management plan sets eradication methods and goals, monitoring methodology, plans awareness raising activities and scientific research. Eradication started in 2005 and has been state organized and funded. The seedbank lasts in the soil for about 7 years, so consistency and good quality work is the key, as one year of seed production gives a setback for several years. On most colonies glyphosate based herbicide is used, on water protection zones and sparse colonies digging is used as a more effective but labour intensive method.

Although some of the colonies have been eradicated by now and are surveyed annually, the area of eradication has increased, because awareness has increased and local people have notified the authorities about existing or new colonies.

Some local authorities also have shown initiative to manage some alien plant species in their territory.

Such alien species as mink (*Mustela vison*), raccoon dog (*Nyctereutes procyonoides*) and Canada goose (*Branta canaensis*) are considered game species, but there are no dedicated management or eradication goals. For three new alien invasions Environmental Board has given out right to hunt:

- the fallow deer *Dama dama*, species was eradicated, new sightings since 2012, exceptional shooting rights given in 2015
- the sika deer *Cervus Nippon*, species was eradicated, new sightings since 2013, exceptional shooting rights given in 2015
- the golden jackal *Canis aureus*, sightings since 2013, exceptional shooting rights given in 2014

In the three known signal crayfish (*Pacifastacus leniusculus*) localities there is management through strong catch pressure and this seems to have positive effect in 2 of the locations as numbers have been very low in recent years.

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ITALY / ITALIE

ITALIAN NATIONAL REPORT ON INVASIVE ALIEN SPECIES FOR BERN CONVENTION RELATED TO ACTIVITIES BIENNIUM 2013-2014 (UPDATE)

National level

Under Italian law on biodiversity, in order to protect national biodiversity, it is actually forbidden to release any alloctonous organism. However, in the event of severe infestation of new parasites, more flexibility should be made possible, with the aim to introduce, after a careful assessment of possible consequences, other antagonistic organism (i.e. infestation of chestnut's cinipedes *Dryocosmus kuriphilus* could be kept under control with release of *Torymus sinensis*) this practice is actually forbidden. Ministry of the Environment, in agreement with other central and peripheral administrations, is therefore now drafting new rules to make possible this derogation. If this amendment to actual legislation will be approved, derogations could be granted in the future, taking into due ISPRA's advice.

Among many initiatives taken at local level, it is worthy to briefly mention LIFE projects that have been implemented:

- Life Project EC SQUARE on management and eradication of grey squirrel (*Sciurus carolinensis*) in Northern Italy has been successfully concluded.
- Another LIFE project on the same species U-SAVERED is now being implemented in Umbria region.
- It is worthy to note a new Life+ project CSMON-LIFE (Citizen Science MONitoring), the first Italian project on citizen science and biodiversity, funded by European Community. Participation of general public is expected, involving citizens in monitoring, management and biodiversity conservation, promoting active relationship between scientific institutions, public sector and stakeholders. This project will take place in regions Lazio and Puglia.
- Life project Rarity (LIFE 10 NAT / IT / 000239) aims to eradicate Louisiana crayfish (*Procambarus clarkii*) in Friuli Venezia Giulia Region.
- Life project Sos Tuscan Wetland aims to control IAS in Tuscany's wetlands, in order to restore threatened habitats.
- Life Project LIFEEMYS in Liguria region, in order to protect native terrapin *Emys orbicularis*, launched actions to remove from natural environment specimens of Invasive water tortoises.
- LIFE Alta Murgia promotes control and eradication of IAS *Ailanthus altissima* in Alta Murgia National Park, in Puglia region.
- An eradication project of rats and *Carpobrotus sp.* in a small island has recently started (2014) on the Tavolara island (marine protected area) within the LIFE project PUFFINUS (<http://www.lifepuffinustavolara.it/>). The project aim also to evaluate the risk posed by alien plant species in the protected area as a basis for prioritizing interventions and controlling pathways. An education and awareness campaign is planned as well.

Italian stakeholders and administrations have been submitting further LIFE+ project on IAS (*Ailanthus altissima*, *Vespa velutina*, *Myocastor coypus*, *Sciurus carolinensis*).

EU level

During 2014 Italy has been engaged in EU negotiation of the new Regulation on Invasive Alien Species, then approved on October 2014 and published at the end of the year. Regulation (EU) No 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species entered into force on 1 January 2015.

Among major task assigned to IAS expert group established under the lead of European Commission, is the definitions of very first list of Invasive Alien Species of European concern. Italy is actively involved in this process.

In order to fulfill obligations and fully and effectively implement the IAS Regulation, Ministry of Environment and land and Sea protection is about to set a permanent consultation group on this very topic, to seek advice and consensus on practical actions and in order to define consolidated practice to tackle invasive alien species and to trigger an early detection mechanism. Ministry of Health, Ministry of Agriculture, and Enforcement bodies are regularly consulted, as well as Region and Autonomous Provinces, under which responsibility will fall practical actions to manage and eradicate invasive alien species. All the national activities are supported by the scientific and technical advice of ISPRA. For those species that are economically relevant, thorough consideration of social and economic impact of prohibition should be taken into account during the decision-making process.

Concerning the list now under scrutiny at EU level, Italy believes that beyond the debate on the inclusion of IAS species selected among those species for which a Risk Analysis are already available, further species deserve a thorough consultation among EU members, and to contribute to produce Risk Analyses for a new bunch of species.

LIECHTENSTEIN / LIECHTENSTEIN



OFFICE OF ENVIRONMENT
PRINCIPALITY OF LIECHTENSTEIN

Your letter
15.April 2015

Reference
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Contact
muol

Vaduz,
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NATIONAL REPORT ON ACTIONS AGAINST INVASIVE ALIEN SPECIES

Actions against invasive alien species since the last report include legislative changes, the development of a GIS application, the preparation of guidelines, continued national and regional collaborations and the development of a new Invasive Neophyte Management Strategy.

In 2014, a Government decision came into effect to commission the Office of Environment with the eradication of *Ailanthus altissima*. The species was not included in the Invasive Neophyte Management Strategy released in 2012 but was spreading aggressively. Experiences in Switzerland showed that immediate measures were needed to control the species and it was consequently decided that strategies had to be implemented prior to the revision of the Invasive Species Management Strategy.

The law regulating the handling of genetically modified, pathogenic or invasive alien organisms (Organismengesetz, 816.1) implemented in 2011 is being revised due to its partial incompatibility with Swiss legislation. It is expected to be implemented later this year.

The ordinance regulating the handling of pathogenic or invasive alien organisms in the environment (Freisetzungsverordnung, 816.114) based on above mentioned law, (Organismengesetz, 816.1) specifies a duty of care, stating that people, animals and the environment should not be harmed by the spread of genetically modified organisms and invasive alien species nor should biodiversity be compromised. As a reminder of this duty formal letters were sent out to businesses potentially handling invasive plants; to gardeners and florists guidelines were sent regarding species that are no longer, or only under certain conditions to be sold, and to construction- and transportation businesses a notice was sent to handle excavation material with care.

In 2013, a web-based GIS application showing the distribution of invasive plant species across Liechtenstein was developed and launched (<http://geodaten.lv.li/geoportal/neophyten.html>). The Office of Environment is responsible for the maintenance of the database and the application but all relevant departments and municipalities have user access and continuously collect and add data. These include information such as the location and species of the plants, the number or local spread as well as implemented eradication strategies (if applicable).

Currently the GIS application includes data collected from 2013 onwards; however, additional records, 2005 – 2012, are available. This data will be included in the GIS application later this year, but needs previous validation.

The GIS application could show that the occurrence of invasive neophytes is concentrated around municipal landfill sites. Probably because of the delivery of excavation material in combination with large unvegetated areas at these sites, invasive species could easily establish. In order to halt further spread of these organisms, guidelines were published in 2014 outlining the correct handling of excavation material from sites affected by invasive plants.

Regional and local collaborations on invasive species management have continued. Given the size of the country, communication with neophyte experts of neighbouring countries, especially Switzerland is of great value. AGIN, a working group involving Swiss and Liechtenstein neophyte professionals has continued to meet regularly. In addition, a new nationwide working group was established in 2013. Representatives of the Office of Environment meet annually with neophyte professionals of each of the municipalities for a workshop in order to discuss current issues.

During summer, the Office of Environment employs asylum seekers and unemployed people to support the authorities with the control of *Salidago sp.* *Salidago* is a widespread and abundant problem in protected areas like Liechtensteins only Ramsar site, the Ruggeller Riet. Additionally, NGO's and municipalities regularly organise days to get engaged in the control of different neophytes, focussing especially on protected areas.

This year the revised Invasive Plant Management Strategy will be implemented. The draft has been completed and will as a next step go through the legislative process by consultation. The new Management Strategy does identify the most problematic neophytes and provides guidelines to eradicate, reduce or stabilise populations depending on factors like distribution and number of areas affected.

Oliver Müller
Office of Environment
Section Nature and Landscape

MALTA / MALTE

SHORT WRITTEN CONTRIBUTION ON IAS WORK BY MALTA

INFORMATION PROVIDED BY THE ECOSYSTEMS MANAGEMENT UNIT,

MALTA ENVIRONMENT AND PLANNING AUTHORITY, MEPA

2015

Legal Framework

The implementation of national legislation incorporating provisions on the prevention, regulation and control of alien and invasive species has continued, in line with requirements of the Bern Convention, other multilateral environmental agreements and related EU policy. The EU Regulation No. 1143/2014 of the European Parliament and of the Council on the Prevention and Management of the Introduction and Spread on Invasive Alien Species came into effect on 1 January 2015. The national implementing legislation to address those provisions of Member States competence is currently being drawn up. Malta is also attending the meetings of the Committee on Invasive Alien Species to discuss the implementing acts required by Regulation (EU) No. 1143/2014, as well as the meetings of the Scientific Forum on Invasive Alien Species in line with Article 28 of the Regulation (EU) No 1143/2014.

Within the framework of the Animal Welfare Act, the “Protection of Animals offered in Pet Shops (Minimum Standards) Regulations, 2014” (SL439.16) were issued in July 2013. These regulations include the concept of contingency with regard to escapees and in cases of emergency. The regulations are available in English from:

<http://www.justiceservices.gov.mt/DownloadDocument.aspx?app=lom&itemid=12084&l=1>.

Nature-Related Strategic Policy and Supplementary Policy Guidance

The first review of implementation of Malta’s National Biodiversity Strategy and Action Plan (2012-2020) entitled “Working Hand-in-Hand with Nature” was completed and is available as part of Malta’s Fifth National Report to the Convention on Biological Diversity (<http://www.cbd.int/doc/world/mt/mt-nr-05-en.pdf>). Within the context of invasive alien species, reported progress is as follows for the national target and related NBSAP measures, respectively:

| National Target | Progress | Comments |
|--|--|---|
| <p>NBSAP Target 9 - <i>By 2020, measures are in place to prevent, in so far as practical, the introduction and establishment of new invasive non-native species, while those that are established are identified and prioritised for eradication or control, where feasible.</i></p> | <p>😊 - Good progress made but further action is required to achieve the target</p> | <p>Progress is reported vis-à-vis implementation of the specific NBSAP measures (see below), reinforcing of the national target via the adoption of targets as part of Malta’s implementation of the Marine Strategy Framework Directive and the initial assessment (http://www.mepa.org.mt/water-msfd), and completion of the EU co-financed MedPAN North project, which included a survey of targeted marine alien species in Malta’s marine protected areas (http://www.mepa.org.mt/med_medpannorth). When considering indicators used to assess progress towards the target, there is an increasing trend of alien species introductions</p> |

| | | |
|--|--|---|
| | | in the marine environment as verified by records being documented in scientific literature (e.g. Evans, Barbara & Schembri, 2015), as well as unintentional introduction of terrestrial alien species with the movement of goods. |
|--|--|---|

In the case of the NBSAP measures under the Theme 4: Biological Introductions (Code - BI), progress is as follows, bearing in mind the different timelines: ■ 2012-2014 ■ 2015-2017 ■ 2018-2020 ■ 2012-2020

| Measure | Progress | Comments |
|--|--|--|
| BI1: <i>A national information and early warning system (e.g. species black list + existing border controls and permitting procedures) is in place to prevent the introduction and spread of invasive non-native species via priority pathways. Accidental introductions are addressed by way of contingency planning thereby avoiding/minimising any socio-economic and environmental impacts.</i> | ☺ - Good progress made but further action is/initiatives are required to implement the measure | Malta currently adopts border inspection posts as required by relevant EU policy, as well as applies permitting procedures for importation from third countries and transport, as required. Release of species into the environment is also controlled. The EU Regulation No. 1143/2014 of the European Parliament and of the Council on the Prevention and Management of the Introduction and Spread on Invasive Alien Species requires restrictions to be applied to IAS listed as of EU concern combined with <i>inter alia</i> the use of official controls at borders at member state level plus the establishment of a permitting system (combined with conditions such as contingency plans). This Regulation is binding to all Member States, including Malta as from 1 January 2015. The national implementing legislation to address those provisions of Member States competence is currently being drafted. Monitoring of alien species through Rapid Assessment Surveys in hotspots (namely harbours which are considered to be the main points of entry in view of shipping activities) is being included in Malta's monitoring programme for the marine environment. This would allow detection of alien species at an early stage. |
| BI2: <i>A systematic and coherent national strategy on invasive non-native species is in place by 2015 and is based on the CBD's three-stage hierarchical approach, which includes prevention, early detection of the species, and rapid action by eradication, containment and control (where feasible). This strategy is supported by other policy guidance on the removal of invasive species.</i> | ☺ - Good progress made but further action is/initiatives are required to implement the measure | Policy guidance was adopted in 2013 to address invasive plants and restoration of terrestrial plant communities as mentioned in the previous short written contribution by Malta to the Bern Convention. The guidelines are available in English from: http://www.mepa.org.mt/guidelines- alienplants Work has now commenced on the drafting of the national strategy as required by the NBSAP Measure BI2. |

| | | |
|--|---|--|
| <p>BI3: Endemic species and areas of conservation value at risk by invasive species are identified, and prioritised for targeted, well-planned, ecologically and financially feasible remedial action, with the goal of reinstating self-sustaining native communities and healthy ecosystems.</p> | <p>☺ - Good progress made but further action is/initiatives are required to implement the measure</p> | <p>Eradication or control activities are currently identified on an <i>ad hoc</i> basis, and are focussed on priority cases and in certain protected areas. For those terrestrial protected areas where IAS has been identified as a pressure/threat, conservation measures to address such IAS have been defined in the respective management plans. Management plans have been drawn up for all terrestrial protected areas.</p> |
| <p>BI4: Key stakeholder groups, such as traders (pet shops, breeders and nurseries), as well as land and sea users cooperate to prevent the unwanted release/escape and spread of non-native and invasive species into the environment. To assist this, national codes of best practices are established in consultation with key stakeholders and adopted for those sectors that can aid the introduction and spread of invasive species. The drawing up of such codes builds on European Codes of Conduct as adopted under the Bern Convention.</p> | <p>☹ - Inadequate/insufficient/limited progress due to action not yet being made or action still very early in its implementation</p> | <p>Progress is assigned an inadequate status since the timeline was not met. However, work on drafting of recommendations to serve as national codes of best practice is now being done in parallel with the development of the national strategy (see BI2 above).</p> |

Action to combat the adverse effects of Alien Species within Protected Areas

Control of the spread of invasive alien species by site managers within protected areas, combined with monitoring to assess progress and effectiveness of the measures adopted, as well as planting of native species as appropriate, has continued since the last report submitted in 2013. For instance, work has continued to implement the rat eradication programme at the Special Area of Conservation known as L-Inħawi tar-Ramla tat-Torri u ta' l-Irdum tal-Madonna. Other work comprises the rehabilitation of sand dunes at Ir-Ramla tal-Mixquqa to aid in the rehabilitation of the sand dunes. Species targeted for removal in the latter case include: *Carpobrotus spp.*, *Lavatera arborea*, *Agave americana*, *Agave attenuata*, *Aloe ferox*, *Aptenia cordiflora*, *Opuntia stricta* and *Yucca gloriosa*. Additional IAS removal initiatives are currently being planned for other protected areas.

IAS considerations have been integrated in the management plans that have been drawn up for terrestrial Natura 2000 sites under the EAFRD Funded Project on Natura 2000 Management Planning for Malta and Gozo. More information is available at: http://www.mepa.org.mt/eafrd_natura2000.

The MedPAN North project, which included the participation of the Malta Environment and Planning Authority, has been completed. This also comprised the undertaking of surveys for the identification of selected marine alien species in Malta's five Marine Protected Areas (MPAs). This initiative involved the voluntary participation of divers and was assisted by the scientific guidance provided by the Department of Biology within the University of Malta. The selection of marine alien species in this project was based on existent scientific literature and limited to those which are easily identifiable and likely to be present in local MPAs. The species in question were: *Lophocladia lallemandii*, *Halophila stipulacea*, *Caulerpa racemosa* var. *cylindracea*, *Asparagopsis* spp., *Percnon gibbesi*, *Bursatella leachi*, *Sphoeroides pachygaster*, *Fistularia commersonii*, *Siganus luridus*, *Stephanolepis diaspros*, *Brachidontes pharaonis*, *Pinctada radiata* and *Crassostrea gigas*. The first survey was run in January 2013, with the participation of approximately thirty volunteers and fifteen surveys were carried out. The second survey was run in June. The most sighted species were: *Caulerpa racemosa* var. *cylindracea*, *Asparagopsis* spp., *Siganus luridus* and *Lophocladia lallemandii*. The results show that different species were sighted in January to

those sighted in June except for the *Caulerpa racemosa* and *Asparagopsis* spp., which were sighted in both surveys on three different occasions. It is suggested that sightings of the invasive species were not alarming and do not call for immediate measures; however, further consultations and investigation is suggested to establish whether there has been an increase of these sightings when compared to past studies, after which management measures may be considered.

REPUBLIC OF MOLDOVA / RÉPUBLIQUE DE MOLDOVA

NATIONAL REPORTS ON INVASIVE ALIEN SPECIES OF THE REPUBLIC OF MOLDOVA

Biodiversity in the Republic of Moldova is conditioned by its geographic position, while its territory is situated at the junction of 3 bio-geographic zones:

- a) *Central-European*: represented by the Central Moldovan Plateau (maximal height 430 m) with the largest forests in the country (Codru woods), where important spontaneous plant and wild animal communities are preserved;
- b) *Eurasian*: represented by forest steppes and steppes regions;
- c) *Mediterranean*: represented by fragments of xerophyte forest steppe in the South of the country.

Many populations are situated at the extremes of the natural areas of species, which increases vulnerability to climate change and anthropogenic factor. As a mainly agricultural country, the biodiversity of crop plants and livestock is especially important for the country's economy.

The flora of the Republic of Moldova includes 5,568 species of plants (of which 2,044 species of superior plants and 3,524 species of inferior plants), with a series of relict tertiary and quaternary species, while several very rare species are the sub-endemic element. Over 30 species of ligneous plants are important sources of existence for the rural population, about 200 species of medicinal plants, while about 700 species of plants from spontaneous flora are fodder plants that serve as food for wild animals and the livestock. The Red Book of the Republic of Moldova (2nd edition) includes 117 species of rare, vulnerable and endangered plants.

The diversity specific to the animal kingdom is explained by the landscape variety where there are, at relatively small distances, various types of ecosystems (forests, water, steppe, grasslands, rocks) and morphologic structures of the relief (hollows, terraces, narrow valleys, etc.). The Republic of Moldova borders the Balkan region and forms a transition zone between the elements of the continental Asian steppe fauna and the European forest steppe.

There are about 15,000 species of animals, of which: 474 species are vertebrate (75 species of mammals, 281 species of birds, 14 species of reptiles, 14 species of amphibians and 90 species of fish), other species being non-vertebrate (mainly insects).

The 2nd edition of the Red Book of the Republic of Moldova includes 116 species of rare, vulnerable and endangered animals. The most endangered are reptiles, so that out of the total of 14 species existing on the territory of the country, 8 species (57.1%) are included in the Red Book of the Republic of Moldova.

The invasive species cause a strong negative impact on the biodiversity of the Republic of Moldova. The invasion of synanthropic species in the degraded natural ecosystems hinders the processes of restoring the natural biocenoses and affects their functionality.

The irrational use of natural ecosystems has led to their fragmentation, to a considerable reduction of the number and even extinction of some species. The absence of rivals and the presence of free ecological niches, create preconditions for the emergence of alien (foreign) species and the numerical growth of some native species, which by their excessive development may become invasive.

About 150 species of invasive animals inhabit the territory of the republic, including about 130 species that damage the crops and 15 species - forests. It was found that the annual losses from agriculture constitute 5-10% at grain crops, 15% at weeding plants and 25% at perennial crops.

Native invasive species are considered the common vole (*Microtus arvalis*), the common rat (*Rattus norvegicus*), the house mouse (*Mus musculus*) and dozens of species of insects – the main pests of agricultural crops and forests. Alien invasive species are considered the Colorado potato beetle (*Leptinotarsa decemlineata*), the fall webworm (*Hyphantria cunea*) Mediterranean fruit fly (*Ceratitis capitata*), San Jose scale (*Quadraspidiotus perniciosus*), etc.

The weeds with aggressive nature constitute 114 species, of which 11 - quarantine species. The representatives of these species damage mostly natural ecosystems of degraded pastures and agricultural ecosystems. *Acer negundo* represents a considerable danger to forest ecosystems.

Many non-native species of animals were introduced deliberately, though not always scientifically argued (raccoon dog, muskrat, dappled *deer*, pheasant, etc.). Over the years it was observed that the raccoon dog and the muskrat have become invasive species and the dappled *deer* proved to be dangerous for maintaining the native species of common deer.

Combating invasive alien species such as the Ash-leaved Maple (*Acer negundo*) is a problem in the forest management. Climate change creates favorable conditions for adaptation of many invasive insects. In 2007, then in 2009, because of this phenomenon, more than 60 000 ha were invaded by locusts (*Calliptamus italicus*, *Paracoptera microptera*, *Oedaleus decorus* and *Chorthippus albomarginatus*). The eventual warming in winter in recent years has led to the increase of the number of pest species, their density and intensity of crop damage. A great danger is related to the adaptation of the common rat (*Rattus norvegicus*) and the house mouse (*Mus musculus*) to the environmental conditions and the increased population of the territory.

Along with the damage that can be caused to the national economy, are intensifying processes of spreading dangerous infections (tularemia, pseudo-tuberculosis, rabies, etc.). Of the 12 ixodid tick species, four of them (*Dermatentor marginatus*, *D. reticulatus*, *Haemaphysalis punctata*, *H. inermis*) have a high adaptive capacity, inhabiting various ecosystems and parasitizing a large number of animals and transmitting dangerous infections.

The Ministry of Environment, being aware of the danger posed by invasive species, founded the need to develop a national strategy to address non-native species, integrated European strategy on biological invasions by funding from the National Ecological Fund project "Identification of invasive animal species in Moldova and assessing their impact on natural and human ecosystems", a project implemented by the Institute of Zoology of the Academy of Science.

Thus, within the project took place the inventorying of species of mammals, birds, reptiles, amphibians, insects, nematodes, fish, mollusks, crustaceans, algae, was established the specific composition of communities of animals, was determined the abundance of species, were identified invasive species and assessed their ecological impact, economic and social, were determined the ways invasive species enter the Republic of Moldova. There were established the main factors favoring overdevelopment invasive species.

It was initiated registry data and information base on non-indigenous species from the Republic of Moldova, which served as the basis for drawing up the national list of invasive animal species - 149 species (-12 mammals, birds, -2, reptiles-3, fish - 4 molluscs-6, crustaceans -1, haematophagous arthropods-11, insects -67, -1 flukes, tapeworms -6, -36 nematodes). The systematic structure of invasive mammals and birds in Moldova during the Holocene period have been reported 82 invasive species.

The list of the most dangerous invasive species for Moldova (107 species) was made. Of the 100 most dangerous invasive species worldwide of which 55 are animals in Moldova were identified 14 species (25%). (*Dreissena polymorpha*, *Anopheles quadrimaculatus*, *Vespula vulgaris*, *Cinara cupressi*, *Lymantria dispar*, *Salmo trutta*, *Cyprinus carpio*, *Sturnus vulgaris*, *Felis catus*, *Capra hircus*, *Mus musculus*, *Sus scrofa*, *Vulpes vulpes*, *Mustela erminea*)

The pre-print version of the Atlas of invasive entomofauna in Moldova is elaborated, which includes information on invasive entomofauna of corn, Solanaceae, greenhouse plants, fruit trees, vines, ornamental trees and useful invasive entomofauna .

List of invasive species identified in Moldova (elaborated by Institute of Zoology of the Academy of Sciences of Moldova)

| Nr. | Species | North | Center | South | Type species |
|---|--|-------|--------|-------|----------------------------|
| MAMIFERE CLASA MAMMALIA | | | | | |
| 1. | <i>Ondatra zibethicus</i> (Linnaeus, 1766) | + | + | + | acclimatized |
| 2. | <i>Microtus arvalis</i> (Pallas, 1778) | + | + | + | native, invasive |
| 3. | <i>Rattus norvegicus</i> (Berkenhout, 1769) | + | + | + | invasive |
| 4. | <i>Mus musculus</i> Linnaeus, 1758 | + | + | + | native, invasive |
| 5. | <i>Nyctereutes procyonoides</i> (Gray, 1834) | - | - | + | invasive |
| 6. | <i>Vulpes vulpes</i> (Linnaeus, 1758) | + | + | + | native n, invasive |
| 7. | <i>Canis lupus</i> Linnaeus, 1758 | - | + | + | allochthonous |
| 8. | <i>Canis aureus</i> Linnaeus, 1758 | - | + | + | invasive |
| 9. | <i>Cervus nippon</i> Temminck, 1838 | - | + | - | invasive |
| 10. | <i>Cervus dama</i> Linnaeus, 1758 | - | + | - | invasive |
| 11. | <i>Sus scrofa</i> Linnaeus, 1758 | + | + | + | invasive |
| 12. | <i>Ovis ammon</i> (Linnaeus, 1758) | - | + | - | invasive |
| PĂSĂRI CLASA AVES | | | | | |
| 13. | <i>Streptopelia decaocto</i> (Frivaldszky, 1838) | + | + | + | expansion |
| 14. | <i>Phasianus colchicus</i> Linnaeus, 1758 | + | + | + | acclimatized introduced |
| REPTILE CLASA REPTILIA | | | | | |
| 15. | <i>Eremias arguta</i> Pallas, 1773 | | | | invasive |
| 16. | <i>Podarcis tauricus</i> (Pallas, 1814) | | | | invasive |
| 17. | <i>Podarcis muralis</i> (Laurenti, 1768) | | | | invasive |
| PEȘTI CLASA PISCES | | | | | |
| 18. | <i>Carassius gibelio</i> (Bloch, 1782) | + | + | + | invasive |
| 19. | <i>Pseudorasbora parva</i> (Temminck & Schlegel, 1846) | + | + | + | invasive |
| 20. | <i>Lepomis gibbosus</i> (Linnaeus, 1758) | - | + | + | invasive |
| 21. | <i>Perccottus glenii</i> Dybowski, 1877 | + | + | - | invasive |
| MOLUȘTE CLASA BIVALVIA | | | | | |
| 22. | <i>Dreissena bugensis</i> Andrusov, 1897 | + | + | + | invasive |
| 23. | <i>Corbicula fluminea</i> (Müller, 1774) | - | - | + | invasive |
| 24. | <i>Corbicula fluminalis</i> (Müller, 1774) | - | - | + | invasive |
| 25. | <i>Sinanodonta woodiana</i> (Lea, 1834) | - | - | + | invasive |
| MOLUȘTE CLASA GASTROPODA | | | | | |
| 26. | <i>Ferrissia fragilis</i> (Tryon, 1863) | - | - | + | invasive |
| 27. | <i>Potamopyrgus antipodarum</i> (Gray, 1843) | - | - | + | invasive |
| Subîncręgătura CRUSTACEA Clasa MALACOSTRACA Ordinul DECAPODA | | | | | |
| 28. | <i>Macrobrachium nipponense</i> (de Haan, 1849) | - | - | + | acclimatized |
| ARTROPODELE HEMATOFAGE | | | | | |
| 29. | <i>Ixodes ricinus</i> (L.) | | | | |
| 30. | <i>Varooa jacobsoni</i> | | | | |
| 31. | <i>Anopheles claviger</i> (Meigen, 1804) | | | | |
| 32. | <i>Anopheles atroparvus</i> Van Thiel, 1927 | | | | |
| 33. | <i>Anopheles maculipennis</i> Meigen, 1818 | | | | |
| 34. | <i>Anopheles melanoon</i> Hackett, 1934 | | | | |

| | | | | | |
|--|---|---|---|---|----------|
| 35. | <i>Anopheles messeae</i> Falleroni, 1926 | | | | |
| 36. | <i>Anopheles sacharovi</i> Favre, 1903 | | | | |
| 37. | <i>Anopheles plumbeus</i> Stephens, 1826 | | | | |
| 38. | <i>Anopheles hyrcanus</i> (Pallas, 1771) | | | | |
| 39. | <i>Anopheles pseudopictus</i> Grassi, 1899 | | | | |
| INSECTE CLASA INSECTA | | | | | |
| Insecta: Hemiptera: Aphididae | | | | | |
| 40. | <i>Aphis fabae</i> Scopoli, 1763 | + | + | + | invasive |
| 41. | <i>Aphis pomi</i> De Geer, 1773 | + | + | + | invasive |
| 42. | <i>Aphis spiraephaga</i> F.P. Müller, 1961 | + | + | + | invasive |
| 43. | <i>Brachycaudus helichrysi</i> (Kaltenbach, 1843) | + | + | + | invasive |
| 44. | <i>Brachycaudus (Prunaphis) cardui</i> (Linnaeus, 1758) | + | + | + | invasive |
| 45. | <i>Brevicoryne brassicae</i> (Linnaeus, 1758) | + | + | + | invasive |
| 46. | <i>Dysaphis devectora</i> (Walker, 1826) | + | + | + | invasive |
| 47. | <i>Eriosoma lanigerum</i> (Hausmann, 1802) | + | + | + | invasive |
| 48. | <i>Hayhurstia atriplicis</i> (Linnaeus, 1761) | + | + | + | invasive |
| 49. | <i>Hyalopterus amydali</i> (E. Blanchard, 1840) | + | + | + | invasive |
| 50. | <i>Hyalopterus pruni</i> (Geoffroy, 1762) | + | + | + | invasive |
| 51. | <i>Hyperomyzus lactucae</i> (Linnaeus, 1758) | + | + | + | invasive |
| 52. | <i>Macrosiphum euphorbiae</i> (Thomas, 1878) | + | + | + | invasive |
| 53. | <i>Myzus cerasi pruniavium</i> (Börner, 1926) | + | + | + | invasive |
| 54. | <i>Myzus (Nectarosiphon) persicae</i> (Sulzer, 1776) | + | + | + | invasive |
| 55. | <i>Cinara cupressi</i> (Buckton, 1881) | + | + | + | invasive |
| Insecta: Homoptera: Cicadellidae | | | | | |
| 56. | <i>Macrosteles laevis</i> (Ribaut 1927) | + | + | + | invasive |
| 57. | <i>Psammotettix (=Deltocephalus) alienus</i> (Dahlbom 1850) | + | + | + | invasive |
| Insecta: Homoptera: Cicadidae | | | | | |
| 58. | <i>Tibicina haemotodes</i> Scopoli, 1763 | + | + | + | invasive |
| Insecta: Homoptera: Cicadidae | | | | | |
| 59. | <i>Quadraspidiotus perniciosus</i> Comst., 1881 | + | + | + | invasive |
| 60. | <i>Quadraspidiotus ostreaeformis</i> Curt., 1961 | + | + | + | invasive |
| 61. | <i>Epidiaspis leperii</i> Sign., 1869 | + | + | + | invasive |
| Insecta: Homoptera: Coccidae | | | | | |
| 62. | <i>Parthenolecanium corni</i> Bouche | + | + | + | invasive |
| Insecta: Tysanoptera: Thripidae | | | | | |
| 63. | <i>Frankliniella intonsa</i> Tryb. 1895 | + | + | + | invasive |
| 64. | <i>Thrips tabaci</i> Lind. 1758 | + | + | + | invasive |
| Insecta: Tysanoptera: Phloeothripidae | | | | | |
| 65. | <i>Haplothrips tritici</i> (Kurdjumov 1912) | + | + | + | invasive |
| Insecta: Odonata: Coenagrionidae | | | | | |
| 66. | <i>Erythromma viridulum</i> (Charpentier 1840) | + | + | + | invasive |
| 67. | <i>Ischnura elegans</i> (Vander Linden 1820) | + | + | + | invasive |
| Insecta: Odonata: Platycnemidae | | | | | |
| 68. | <i>Platycnemis pennipes</i> (Pallas 1771) | + | + | + | invasive |
| Insecta: Orthoptera: Acrididae | | | | | |
| 69. | <i>Calliptamus italicus</i> Linnaeus, 1758 | + | + | + | invasive |
| 70. | <i>Dociostaurus maroccanus</i> Thunberg, 1815 | + | + | + | invasive |
| 71. | <i>Locusta migratoria</i> (Linnaeus, 1758) | + | + | + | invasive |
| Insecta: Heteroptera: Coreidae | | | | | |
| 72. | <i>Leptoglossus occidentalis</i> (Heidemann, 1910) | + | + | + | invasive |
| Insecta: Heteroptera: Pentatomidae | | | | | |
| 73. | <i>Perillus bioculatus</i> (Fabricius, 1775) | + | + | + | invasive |

| Insecta: Heteroptera: Tingidae | | | | | |
|--|---|---|---|---|--------------|
| 74. | <i>Corythucha ciliata</i> (Say, 1832) | + | + | + | invasive |
| 75. | <i>Elasmotropis testacea</i> (Herrich-Schäffer, 1830) | + | + | + | invasive |
| Insecta: Coleoptera: Curculionidae | | | | | |
| 76. | <i>Lignyodes bischoffi</i> (Blatchley, 1916) | + | + | + | invasive |
| 77. | <i>Sitophilus granarius</i> (Linnaeus, 1758) | + | + | + | invasive |
| 78. | <i>Sitophilus oryzae</i> (Linnaeus, 1763) | + | + | + | invasive |
| Insecta: Coleoptera: Coccinellidae | | | | | |
| 79. | <i>Harmonia axyridis</i> Pallas, 1773 | + | + | + | invasive |
| 80. | Insecta: Coleoptera: Chrysomelidae | | | | |
| 81. | <i>Bruchus pisorum</i> (Linnaeus, 1758) | + | + | + | invasive |
| 82. | <i>Leptinotarsa decemlineata</i> (Say, 1824) | + | + | + | invasive |
| Insecta: Hymenoptera: Aphelinidae | | | | | |
| 83. | <i>Aphelinus mali</i> Haldeman, 1851 | + | + | + | invasive |
| 84. | <i>Encarsia perniciosi</i> Tower, 1913 | + | + | + | invasive |
| Insecta: Hymenoptera: Argiidae | | | | | |
| 85. | <i>Aproceros leucopoda</i> Tacheuchi, 1939 | + | + | + | invasive |
| Insecta: Hymenoptera: Platygastriidae | | | | | |
| 86. | <i>Platygaster robiniae</i> Buhl and Duso, 2008 | + | + | + | invasive |
| Insecta: Hymenoptera: Vespidae | | | | | |
| 87. | <i>Vespa vulgaris</i> (Linnaeus, 1758) | + | + | + | invasive |
| Insecta: Hymenoptera: Psyllidae | | | | | |
| 88. | <i>Psylla mali</i> Schmdb. 1836 | + | + | + | invasive |
| Insecta: Hymenoptera: Aleyrodidae | | | | | |
| 89. | <i>Trialeurodes vaporariorum</i> Westwood, 1856 | + | + | + | invasive |
| Insecta: Diptera: Cecidomyiidae | | | | | |
| 90. | <i>Obolodiplosis robiniae</i> Haldeman, 1847 | + | + | + | invasive |
| Insecta: Lepidoptera: Arctiidae | | | | | |
| 91. | <i>Hyphantria cunea</i> Drury, 1773 | + | + | + | invasive |
| Insecta: Lepidoptera: Erebiidae | | | | | |
| 92. | <i>Lymantria dispar</i> Linnaeus, 1758 | + | + | + | invasive |
| Insecta: Lepidoptera: Gelechiidae | | | | | |
| 93. | <i>Anarsia lineatella</i> Zeller, 1839 | + | + | + | invasive |
| 94. | <i>Sitotroga cerealella</i> Olivier, 1789 | + | + | + | invasive |
| 95. | <i>Scrobipalpa ocellatella</i> Boyd, 1858 | + | + | + | invasive |
| 96. | <i>Tuta absoluta</i> Meyerick, 1917 | + | + | + | invasive |
| Insecta: Lepidoptera: Gracillariidae | | | | | |
| 97. | <i>Cameraria ohridella</i> Deschka & Dimic, 1986 | + | + | + | invasive |
| 98. | <i>Parectopa robiniella</i> Clemens, 1863 | + | + | + | invasive |
| 99. | <i>Phyllonorycter robiniella</i> Clemens, 1859 | + | + | + | invasive |
| 100. | <i>Phyllonorycter issikii</i> Kumata, 1963 | + | + | + | invasive |
| 101. | <i>Phyllonorycter platani</i> Staudinger, 1870 | + | + | + | invasive |
| Insecta: Lepidoptera: Nepticulidae | | | | | |
| 102. | <i>Stigmella aceris</i> Frey, 1857 | + | + | + | invasive |
| 103. | <i>Stigmella prunetorum</i> Stainton, 1855 | + | + | + | invasive |
| Insecta: Lepidoptera: Noctuidae | | | | | |
| 104. | <i>Helicoverpa armigera</i> Hubner, 1805 | + | + | + | invasive |
| 105. | Insecta: Lepidoptera: Pyralidae | | | | |
| 106. | <i>Ephestia kuehniella</i> Zeller, 1879 | + | + | + | invasive |
| 107. | <i>Plodia interpunctella</i> Hubner, 1813 | + | + | + | invasive |
| 108. | <i>Ostrinia nubilalis</i> Hubner, 1796 | + | + | + | invasive |
| Insecta: Lepidoptera: Tortricidae | | | | | |
| 109. | <i>Grapholitha molesta</i> Busck, 1916 | + | + | + | invasive |
| Plathelminthes: Trematoda | | | | | |
| 110. | <i>Plagiorchis elegans</i> (Rudolphi, 1802) | - | - | + | acclimatized |

| Plathelminthes: Cestoda | | | | | |
|--|--|---|---|---|--------------|
| 111. | <i>Skrjabinotaenia lobata</i> (Baer, 1925) | - | - | + | acclimatized |
| 112. | <i>Hydatigera taeniaformis</i> (Batsch, 1786) | - | - | + | acclimatized |
| 113. | <i>Mesocestoides lineatus</i> (Goeze, 1782) | - | - | + | acclimatized |
| 114. | <i>Taenia pisiformis</i> (Bloch, 1780) | - | - | + | acclimatized |
| 115. | <i>Paranoplocephala omphaloides</i> (Herman, 1783) | - | - | + | acclimatized |
| 116. | <i>Rodentolipis straminea</i> (Goeze, 1782) | - | - | + | acclimatized |
| Clasa Nematoda | | | | | |
| 117. | <i>Syphacia obvelata</i> (Rudolphi, 1802) | - | - | + | acclimatized |
| 118. | <i>Syphacia stroma</i> (Linstow, 1884) | - | - | + | acclimatized |
| 119. | <i>Capilaria hepatica</i> (Bancroft, 1893) | - | - | + | acclimatized |
| 120. | <i>Trichocephalus muris</i> (Scrank, 1788) | - | - | + | acclimatized |
| 121. | <i>Mastophorus muris</i> (Gmelin, 1790) | - | - | + | acclimatized |
| 122. | <i>Heligmosomoides polygirus</i> (Dujardin, 1845) | - | - | + | acclimatized |
| 123. | <i>Strongyloides ratti</i> (Sandground, 1925) | - | - | + | acclimatized |
| ORDER RHABDITIDA, INFRAORDER TYLENCHOMORPHA (NEMATODA) | | | | | |
| 124. | <i>Helicotylenchus dihystra</i> (Cobb 1893) | + | + | + | invasive |
| 125. | <i>Helicotylenchus digonicus</i> Perry 1959 | + | + | + | invasive |
| 126. | <i>Rotylenchus agnetis</i> Szczygiel 1968 | + | + | + | invasive |
| 127. | <i>Rotylenchus robustus</i> (de Man 1876) | + | + | + | invasive |
| 128. | <i>Pratylenchus penetrans</i> (Cobb 1917) | + | + | + | invasive |
| 129. | <i>Pratylenchus pratensis</i> (de Man 1880) | + | + | + | invasive |
| 130. | <i>Ditylenchus dipsaci</i> (Kühn 1857) | + | + | + | invasive |
| 131. | <i>Ditylenchus destructor</i> Thorne 1945 | + | + | + | invasive |
| 132. | <i>Heterodera schachtii</i> Schmidt 1871 | + | + | + | invasive |
| 133. | <i>Meloidogyne arenaria</i> (Neal 1889) | + | + | + | invasive |
| 134. | <i>Meloidogyne incognita</i> Kofoid & White | + | + | + | invasive |
| 135. | <i>Meloidogyne halpa</i> Chitwood 1949 | + | + | + | invasive |
| 136. | <i>Meloidogyne javanica</i> (Treub 1885) | + | + | + | invasive |
| 137. | <i>Bitylenchus dubius</i> (Bütschli 1873) | + | + | + | invasive |
| 138. | <i>Paratylenchus nanus</i> Cobb 1923 | + | + | + | invasive |
| 139. | <i>Criconemoides insignis</i> Siddiqi 1961 | + | + | + | invasive |
| 140. | <i>Criconemoides zavadskii</i> (Tulaganov 1941) Raski, 1958 | + | + | + | invasive |
| 141. | <i>Criconemella xenoplax</i> (Raski 1952) | + | + | + | invasive |
| 142. | <i>Xenocriconemella macrodora</i> (Taylor 1936) | + | + | + | invasive |
| 143. | <i>Heterodera schachtii</i> A.Schmidt 1981 | + | + | + | invasive |
| 144. | <i>Aphelenchoides fragaria</i> (Ritzema Bos, 1891) Christie, 1932 | + | + | + | invasive |
| 145. | <i>Trichodorus primitivus</i> (de Man 1880) | + | + | + | invasive |
| 146. | <i>Longidorus elongatus</i> (de Man 1876) | + | + | + | invasive |
| 147. | <i>Longidorus euonymus</i> Mali & Hooper 1974 | + | + | + | invasive |
| 148. | <i>Longidorus macrosoma</i> Hooper 1961 | + | + | + | invasive |
| 149. | <i>Xiphinema diversicaudatum</i> (Micoletzky 1927) | + | + | + | invasive |
| 150. | <i>Xiphinema index</i> Thorne & Allen 1950 | + | + | + | invasive |
| 151. | <i>Xiphinema rivesi</i> Dalmasso 1969 | + | + | + | invasive |
| 152. | <i>Xiphinema vuittenezi</i> Luc & al. 1964 | + | + | + | invasive |

Moldova is a secondary and tertiary country in the spread of invasive species. At the same time, there are dangerous species which tend to restore their primary area, as ex. species of locusts, once exterminated over a vast territory. These should also be considered as invasive alien species. The possibility of establishing a comprehensive system to combat SAI is extremely problematic in terms of institutional and economic conditions. Therefore, it must be defined the most important and realistic course of action. In

principle, the Berne Convention and the Convention on Biological Diversity does not relate to agricultural pests. However, some agricultural pests can cause significant damage to natural ecosystems and to the subnatural (pastures and meadows). Therefore, there cannot be a strict separation. From an organizational perspective, the institutional weakness and economic background of the country, it makes sense to immediately form a IAS cross-sectoral control monitoring system. We also note that the average time of plant species naturalization (for example, botanical gardens), where they do not present a threat, is 147 years old. After naturalization, they can become invasive.

The Action Plan for the enforcement of the Strategy for Biodiversity for the Period 2015-2020 (Annex 2 to the Government Decision no. 274 dated 18 May 2015) provides the measures to diminish the negative impact of invasive species, including the development and implementation of the action plan on invasive species in accordance with the requirements of the Berne Convention, study of the impact of invasive alien species, drafting a program of measures to combat *Acer negundo*, developing guidelines on effective practices combating invasive species and training for the land owners (public and private) on the impact of invasive species and measures to combat them.

The situation is worrying in Moldova on insufficient monitoring capacity, lack of effective measures in emergencies; the current law is imperfect and has poor coordination between government agencies, states and other stakeholders. Thus, there is almost no monitoring and no funding system and its implementation. There are no government agencies and financial resources for the implementation of emergency measures such as a possible increase in the number of invasive alien species on farmland.

In this context, for the development of a national strategy on invasive species is necessary the inventory of invasive plant species, which would complete the real situation, and would create prerequisites for reducing the impact of invasive species on the biological diversity as well as on food security .

NORWAY / NORVÈGE

PRESENTATION TO THE IAS WORKING GROUP OF THE BERN CONVENTION: UPDATE ON THE WORK WITH INVASIVE ALIEN SPECIES IN NORWAY

Principal Adviser Øystein Størkersen
Norwegian Environment Agency (NEA)
Expert Working Group meeting 4-5 June 2015

1. The Norwegian Black List 2012

The first edition of *Alien Species in Norway – with the Norwegian Black List* was issued in 2007 by the Norwegian Biodiversity Information Centre (<http://www.artsdatabanken.no/> & English: <http://www.biodiversity.no/>). The most recent version was published in 2012 and use a new method to categorize the evaluated species. The method was developed by the Centre for Conservation Biology at the Norwegian University of Science and Technology. The methodology can be used for any group of organism (taxa) and therefore the impact categories are comparable across taxa (fungi, insects, plants etc). The black list serves both as a management tool, as well as a source of information for relevant authorities and the public. The used criteria are semi-quantitative and uses precisely defined threshold values (as also used with red lists). Use of quantitative impact assessment reduces the subjectivity, and enables a transparent, repeatable and testable results. Expected ecological effect can be described as the product of invasion potential and ecological effect. A species will have a small impact whenever one of the factors are small, regardless of large the other factor is. This is portrayed on a two dimensional figure, where impact is indicated by the species position along two axes, an invasion potential axis and an ecological effect axis. The end result categorizes the species in five categories: Severe impact (SE), high impact (HI), potentially high impact (PH), low impact (LO) and no known impact (NK). Sub categories, criteria and threshold values for classifying the invasion potential of alien species are assessed according to set criteria on expected population lifetime, expansion velocity, increase in area of occupancy, increase in occurrence and area of habitat type occupied. For ecological effect the subcategories, criteria and values is similarly described along set timelines.

The 2012 black list was developed by a working group of 50 experts under the auspices of the biodiversity centre. Of 2595 recorded alien species in Norway, 1180 was listed: 106 in the highest category with severe impact (SE), 111 with high impact (HI), 198 with potentially high impact (PH), 399 with low impact (LO) and 366 with no known impact (NK). An English version of the black list (212 pp) can be seen at <http://www.artsdatabanken.no/Article/Article/133437>

2. Pathway studies

Knowledge about dispersal pathways and vectors is central to effective prevention of immigration, spread and establishment of alien species. The pattern observed in Norway corresponds to other analyses undertaken on pathways. Most alien species have established in Norway as a result of naturalization, followed by species that have come to the country as a stowaway. This is in contrast to the non-reproductive alien species, where stowaway is by far the most important dispersal pathway. Terrestrial vascular plants is the most important group represented in the data used. In Svalbard, vascular plants constitute the dominant species group, but in recent years there has also been reports of invertebrates and fish (see Hendrichsen et al. 2014).

Recent publications, with focus on pathways:

– **General:**

Hendrichsen, D.K., Åström, J., Forsgren, E. & Skarpaas, O. 2014. Dispersal pathways for alien species in Norway. - NINA report 1091, 113 pp. [in Norwegian with English summary]

– **Specific pathways with high risk:**

Hagen, D., Endrestøl, A., Hanssen, O., Often, A., Skarpaas, O., Staverløkk, A. & Ødegaard, F. 2012. Alien species. Mapping and monitoring of «horticultural import» as a vector for invasion LINK: http://www.nina.no/Portals/0/Nyhetssaker/Dokumenter/NINA%20Rapport%2015_1%C3%A5st.pdf [in Norwegian with English summary]

Westergaard, K.B., Hanssen, O., Endrestøl, A., Often, A., Stabbetorp, O., Staverløkk, A. & Ødegaard, F. 2015. Dispersal of alien species through plant import to Norway – NINA Report 1136. 105 pp [in Norwegian with English summary]

Hagen, D., Endrestøl, A., Hanssen, O., Often, A., Skarpaas, O., Staverløkk, A. & Ødegaard, F. 2012. Alien species. Mapping and monitoring of «timber-import» as a vector for invasion. – NINA Report 980. 92 pp. LINK: <http://www.nina.no/archive/nina/PppBasePdf/rapport/2013/980.pdf> [in Norwegian with English summary]

3. Legislation

Norway has implemented several regulations relevant to alien species, some examples here:

- The wildlife act (1981)
- The Act on Salmonids and Freshwater Fish (1992)

The recent Nature Diversity Act (2009) increases the obligation by both the environmental authorities and the sectors to minimize or compensate for any nature use, through risk analysis and mitigation. The same protection and focus on sustainability is expressed in the Constitution Article 112. The implementation of the new obligatory framework is still ongoing, and we recognize a need for better implementation by the sectors. The diversity act already states that all (incl. sectors) have a responsibility to avoid negative impacts on the environment. This could occur from transport of soil, planting of trees along roads or in parks etc. If negative effects occur, then it is the sector that must remedy the situation.

Recent legislations on alien species, following instructions given in the nature diversity act, are the following two:

Regulation of foreign tree species used in forestry (2012)

Status: 308 administrative decisions (July 2012 – 2014), majority on Christmas tree plantations- 46 on forestry plantations

Regulation on all import of species (excludes some groups, like domestic animals)

A major task has been the development of a new regulation to control all import and use of alien species, with focus on risk assessment. The recommendation for a new regulation on import and release of alien species in Norway has been delivered from the Norwegian Environment Agency to the Norwegian government (spring 2015) and is expected to be adopted 19. June 2015 and to enter into force as of 1 January 2016. The regulation has been on a public hearing (2014), and will implement relevant parts of the Norwegian Nature Diversity Act of 2009. LINK: <https://www.regjeringen.no/en/dokumenter/nature-diversity-act/id570549/>

Importantly the new regulation will:

- Cover all species groups and require permits for imports
- Risk analysis will be the basis for granting permits or not
- Lists of species prohibited from import and for trade will be issued

4. Management and action plans

One of the species where most funds have been spent is the fight against *Gyrodactylus salaris* (salmon lice). This alien species has infected a number of watercourses and huge sums are used in eradication. Mostly this includes treatment with rotenone of the entire watercourse.

Most action plan are focusing on reducing the effects of fairly common invasive alien species. These are conducted mostly by municipalities, while the central conservation authorities has issued guidelines and in some cases support financially these activities. The support was important in the initial phase in the late 1990ies. Today funds are channeled through the government representative at the regional level (ie County Governors). These coordinate and encourage local activities. The counties also manage protected areas. Since it is considered that invasive alien species is a serious threat to >30% of the protected areas, special focus is afforded to support activities in these areas. The national State Rangers are often used to handle machinery and manpower in these areas.

For some species it has been published national action plans against invasive alien species. Importantly these are on racoon dog (2008), cf also a Nordic collaboration programme; American mink (2012) and for Japanese rose *Rosa rugosa* (2013). Others are also active. For the mentioned species the aim is to prevent the racoon dog from becoming established in Norway, as it is seen as a tremendous threat to birds and mammals. So far the species has been eliminated from the country, while substantial populations exists in Finland, Denmark and Sweden. The mink eradication programme is highly successful in removing the species from breeding islands for seabirds. However it need annual and regular follow up, while the reward is successful breeding of seabirds. Japanese rose eradication is foremost focusing on protected areas and aims to eliminate the species totally. The species is mostly spread on sandy beaches, but also occur on rocky beaches.

On monitoring programmes the national environment authority remarks that here is generally a serious lack of resources to undertake adequate monitoring. The authorities especially sees a challenge with horticulture import (cf several studies on plant imports and accidental follow organisms), introduction and spread of alien freshwater fish through both aquafarming, private releases (strictly forbidden) and ornamental fish trade, and the ongoing spread of coastal alien marine species of many different taxa (eg jellyfish, mussels, crabs, seaweed).

Climate change has exerbated the situation and enabled the spread of more alien species not only in mainland Norway, but also into the Artic regions where expanding human economic activities is a cause of concern. Norway sees it as important that the international community steps up its efforts to ban or regulate trade in known pest species. This could be through increased efforts by for instance the EPPO, EU, IMO and nationally through compliance with decisions made by the biodiversity Conventions.

5. Scientific committee on risk-analysis

Funding for a new committee under the existing committee for food and health has been granted. The committee will start its work summer 2015 and be fully operational from 2016. The new committee will mainly do risk-analysis for import of live organisms (incl. microorganisms, GMO) and for CITES non-detriment finding analysis for imports and exports. The independent analysis will be conducted by the best qualified experts and will form basis for the final decisions on import by the Environmental Agency. Reports from the committee will be publicly available in English. This new committee is seen as a necessary follow up on the new regulation on alien species, cf. para 3.

POLAND / POLOGNE

STATUS OF WORK WITH IAS IN POLAND 2013-2015

REPORT TO THE BERN CONVENTION

This report describes progress made in work with IAS in Poland since the previous Bern Convention IAS expert meeting in Sardinia in 2013. Please consult previous reports to the Bern Convention on this issue for a more comprehensive image of the status of work with IAS in Poland.

Building awareness and support

Efforts are undertaken to raise the level of awareness of the problem of biological invasions. Polish Code of conduct on ornamental alien plants and IAS was adopted in 2014. It had been developed with a wide participation of many stakeholders, including nature conservation sector, scientists, ornamental plants producers and sellers, landscape architects, and honey producers. Further activities aimed at promotion of the Code are being planned, including setting up a dedicated web site.

Internet portals on biological invasions in Poland available at the Institute of Nature Conservation, Polish Academy of Sciences received over 400 000 visits over the past 3 years. They were significantly developed to make them more useful for non-expert users. This includes new modules explaining basic elements of causes and results of biological invasions and ways in which different stakeholders (pet owners, anglers, garden lovers etc.) can contribute to worsening and improving the situation. The new version of the portal presents also most important news on biological invasions in Poland.

The problem of alien species is also more and more frequently covered in media, both for general public and for specific groups, such as pet owners, birdwatchers, hunters etc.

Collecting, managing and sharing information

In addition to the above mentioned initiatives, there is an ongoing work in a number of academic centres to study the specific aspects of the presence of different invasive alien species in Poland.

The online database "Alien species in Poland" (<http://www.iop.krakow.pl/ias/default.aspx>) has been continuously developed since 1999 at the Institute of Nature Conservation, Polish Academy of Sciences. Currently there are 1285 species in the database.

A number of conferences presents the problem of biological invasions. The targeted audience included foresters, gardeners, phytosanitary sector and hunters.

Strengthening national policy, legal and institutional frameworks

In 2015 the new legal act of the European Union came into force (Regulation of the European Parliament and of The Council on the prevention and management of the introduction and spread of invasive alien species). Poland has been preparing frameworks required to implement this legal act, including modification of the national legal system.

In 2014 Poland two management plans were developed on invasive alien species: on hogweeds and sika deer. In 2015 two further management plans will be prepared, concerning knotweeds eradication and invasive alien turtle management.

Regional cooperation and responsibility

Poland contributes to regional cooperation and responsibility in IAS-related issues, including participation in NOBANIS and DAISIE projects, and the Carpathian Convention and HELCOM.

Prevention

Recent progress in developing regulatory and non-regulatory frameworks is aimed at reducing risks of new introductions. Cooperation between nature conservation, phytosanitary and veterinary services, custom and border control, will be developed over the next two years.

Early Detection and Rapid Response

Since 2010, IAS have been included into Natura 2000 sites monitoring system. Organizations of nature lovers, particularly birdwatchers, contribute to rapid detection and advertising new alien species with electronic listservers. Wider participation of other sectors, in monitoring IAS threatening biodiversity is under discussion, including phytosanitary and veterinary services.

Mitigation of impacts

As in the previous years, there have been many local attempts to mitigate impacts from IAS, especially in protected areas. Chestnut leaf-miner *Cameraria ohridella*, Japanese knotweed *Fallopia japonica*, and hogweeds *Heracleum mantegazzianum* and *Heracleum sosnowskyi* remain the most frequent targets. *Acer negundo*, *Fraxinus pennsylvanica*, *Impatiens glandulifera*, *Impatiens parviflora*, *Padus serotina*, *Quercus rubra*, *Robinia pseudoaccacia*, *Symphoricarpos albus* are other examples of species which are being removed. Budgets of some projects increased to the level making it possible to attempt control of these species over considerably large areas.

For giant hogweed *Heracleum mantegazzianum* and Sosnowsky's hogweed *Heracleum sosnowskyi*, a university is holding an internet portal with a database and maps of distribution in Poland, with possibility for entering new locations, as well as offers setting up mitigation plans of local populations of these species.

Long-term control of American mink *Neovison vison*, raccoon *Procyon lotor* and raccoon dog *Nyctereutes procyonoides* has been continued in five national parks thanks to LIFE+ funding. The project was finished in 2014. The expected results were achieved. One of them was a reduction in the number of invasive alien predatory species by using live traps to minimise their negative impact. There was about 600 specimens of American mink and about 120 specimens of racoon eradicated.

PORTUGAL / PORTUGAL

INVASIVE ALIEN SPECIES - PORTUGAL (2013-2014)

ICNF, IP, PORTUGUESE AGENCY FOR NATURE CONSERVATION AND FORESTS

STRENGTHENING NATIONAL POLICY, LEGAL AND INSTITUTIONAL FRAMEWORKS

National instrument to the implementation of the European Strategy on Invasive Alien Species

The National Strategy for Nature Conservation and Biodiversity is considered the national instrument to the implementation of the European Strategy on Invasive Alien Species. Since the summer of 2014 it is undergoing a revision process that is expected to be concluded during 2015. The revised document provides *inter alia* for the establishment of an integrated system of early warning, rapid response and control or eradication of invasive alien species.

Regulation (EU) No. 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species

The Regulation entered into force on 1 January 2015 and it is binding in its entirety and directly applicable in all Member States.

Decreto-Lei n.º 565/99, de 21 Dezembro

The Portuguese regulation on invasive alien species started a new revision process at the end of 2012 but this process was suspended until the conclusion of the discussions on the above mentioned EU Regulation. It was resumed in early 2015 and it is expected to be concluded at the latest in early 2016.

According to that legislation there is a number of alien species with invasive capacities or that can have ecological negative impacts that can't be held, released to the nature or traded. Furthermore, any request for introduction of an alien species need to be accompanied by a risk analysis and obtain a positive advise by ICNF.

ICNF (*Instituto da Conservação da Natureza e das Florestas*), the Portuguese agency for nature conservation and forests is the major responsible for the implementation of national and EU regulations on IAS.

Portaria n.º 1226/2009, de 12 de Outubro

Prohibits/regulates holding and possession of live specimens of several animal species (especially alien species).

Under the **legal regime of Environmental Impact Assessment** and in what concerns to mitigation/compensation measures, several EIA processes are submitted to changes on the recovery projects in order to include measures of control/recuperation of areas occupied by invasive alien species.

National Forest Strategy 2015

According to the revised National Forest Strategy published in early 2015 the evolution of the territorial expression of woody IAS (mainly from the genera *Acacia* and *Hakea*) is evident but insufficiently quantified. Nevertheless, the preliminary results of the 6th National Forest Inventory indicates that from 1995 to 2010 the area occupied by forest dominated by species of the genus *Acacia* almost duplicated (approx. 98.5 increase) corresponding to an average increase of approx. 7% per year. A

National Action Programme to Fight Invasive Woody must be prepared that identifies priority areas of action at regional and sub-regional level, to ensure coherence and focus on implementation. The need to implement this program is identified as one of the measures to adaptation of forests to climate change.

Alien organisms harmful to plants/plant products and animals are dealt under **national phytosanitary and animal health legislations** that include the transposition of EU regulations on these issues.

AWARENESS AND SUPPORT

Invasive species control actions

Every year several actions to control invasive plants are promoted by NGO's, municipalities and other civil society organisations, some with the support of ICNF.

One of these actions, on the 12th April 2014, attracted particular attention from the media, due to the presence of the minister of agriculture and the secretary of state for forests, which participated actively on the actions to control several alien plants (*Acacia* spp., *Arundo donax* and *Carpobrotus edulis*) at Valado National Forest (in the centre of the country).

Scientific Working Camps on Control of Invasive Plants

Promoted by Centro de Ecologia Funcional / Universidade de Coimbra and Escola Superior Agrária de Coimbra in order to contribute to the dissemination of the theme of biological invasions and simultaneously to the resolution of this serious environmental problem (see <http://invasoras.uc.pt/>). These camps are linked to another type of actions, the **Days on Invasive Plants Control**, which consist of one day activities for volunteers that participate in control and awareness actions.

Invasive Plants: a threat from abroad (Project Media Ciência nº 16905) (2011-2013)

Project to produce contents for the promotion of science and technology in the media. The main goal is to explain the problem of invasive plants, training ordinary people as well as technicians to recognize and control invasive species. (see <http://invasoras.uc.pt/>).

Programme: Project Media Ciência N.º 16905

Funding: cofunded by EU/FEDER, through QREN¹ (*Programa Fatores de Competitividade — COMPETE*) and national funding through Ciência Viva — *Agência Nacional para a Cultura Científica e Tecnológica* [Ref: n.º 16905].

Proposing institution: CFE/UC (coordination by Elizabete Marchante).

Practical Workshop on Invasive Plants – identification and mapping

Coimbra, 9 September 2013. Organised by Escola Superior Agrária / Instituto Politécnico de Coimbra and Centro de Ecologia Funcional / Universidade de Coimbra

Programme:

- introduction and context to the issue of invasive plants
- identification of the main invasive plant species occurring in mainland Portugal
- use of an on-line and interactive map and an Android App. to register invasive plants location points

¹ *Quadro de Referência Estratégica Nacional* - National Strategic Reference Framework

EPPO-Council of Europe-IUCN workshop on “How to communicate on Pests and Invasive Alien Plants”

Oeiras, October 2013

Organised with the support of Escola Superior Agrária de Coimbra e Centro de Ecologia Funcional / Universidade de Coimbra, Direção Geral de Alimentação e Veterinária (DGAV, the Portuguese directorate-general for plant and animal health and food security).

Workshop on Invasive Alien Species

Lisbon, 2 June 2014

Organised by FCUL / Department of Animal Biology

XIII Symposium of the AIMJB - Invasive Alien Species and Botanical Gardens: challenges and responsibilities

Organised by AIMJB - Ibero-Macaronesian Association of Botanical Gardens

COLLECTING, MANAGING AND SHARING INFORMATION

Research and development in the context of invasive species are needed to better know, inter alia, dispersal mechanisms and techniques for species control and recuperation of affected areas.

Woody invasive species represent an increasingly evident threat in forested areas. In fact there is a widespread lack of knowledge about the most effective techniques to fight it. Thus it is paramount to identify management models that prevent the increase or even, that promote the reduction of its occurrence area. For this it will be critical to inventory its occurrence and to monitor its progress, being this very frequently associated with forest fires. It is also essential to study the physiology of woody invasive species in order to improve knowledge about its invasion strategy.

Several projects have been launched on alien invasive species. Some examples are shown.

Biological invasions in island ecosystems: the impact of mutual interference between natural enemies (2008 - 2014)

Post-doctoral scholarship for strengthening R & D Units Accredited (Azores regional government). M1.1.2/F/009/2008 Jose Alberto Pinheiro Marcelino (Centro de Investigação de Recursos Naturais da Universidade dos Açores - CIRN).

The disease of the pine wood nematode in Portugal: integrated interdisciplinary study (control of the vector insect) (2009-2014)

The aim of this project is to study and develop techniques for reducing the incidence of wilt disease of pines caused by alien nematode *Bursaphelenchus xylophilus*, known as the pine wood nematode, by regulating its vector insect *Monochamus galloprovincialis* and the Scolitidae beetles associated with pine mortality in Portugal. The studies include the characterization of the complex of natural enemies of *M. galloprovincialis*, especially parasitoids and entomopathogenic fungi, the preliminary screening of active substances which operate by contact, the determination of normal and maximum flight distance reached by *M. galloprovincialis* adults, the identification of the main compounds of pine (terpenoids and volatile compounds) responsible for the attraction of the vector insect, the determination of substances/combinations and trap model more efficient to attract adults of *M. galloprovincialis* on the wild.

Research Protocol INRB, IP / Fundo Florestal Permanente

Proposing institution: INRB, IP

Climate change and fish communities of Mediterranean type water courses. Potential impact on bio-integrity and implications for the assessment of ecological status (2010-2013)

Program: PTDC/AAC-AMB/102541/2008

Funding: Fundação para a Ciência e a Tecnologia

Proposing institution: Universidade de Évora

Assessment of the level of risk for the spread of the Pine Wood Nematode *Bursaphelenchus xylophilus* from a pool pallet (2009-2014)

The aim of this project was to determine the risk of spread of the nematode *Bursaphelenchus xylophilus* through pine wood pallets used in trade, through a series of experiments under controlled conditions that simulate the various stages of a wood pallet in trade, including maintenance and repair. It was sought to determine the minimum threshold of wood moisture content for the transferring of the nematode, and how this knowledge can be used to prevent infections. After contact between a piece of wood infected with nematodes with a non-infected one how much time is required for the transition to occur and then how deep it penetrates.

Research contract INRB, IP / CHEP

Proposing institution: INRB, IP

NISTRACKS - Processes that influence the behavior of invasive non-native species *Corbicula fluminea* (Mollusca: Bivalvia) in estuaries - identification of genetic and environmental key factors (2010 – 2013)

Program: PTDC/AAC-AMB/102121/2008

Funding: Fundação para a Ciência e a Tecnologia (co-funded by COMPETE)

Proposing institution: Centro Interdisciplinar de Investigação Marinha e Ambiental

Alive bait – Polychaets used as alive bait in Portugal: harvesting management, importation and culture (2010-2015)

The major objective of this project is the development of technological solutions for cultivation of *Hediste diversicolor* and other polychaetes with commercial interest as a support to promote a sustainable harvesting management and control impacts of alive bait importations, including the introduction of non-indigenous species.

Program: Fisheries Program PROMAR

Funding: European Fisheries Fund

Proposing institutions: Instituto Politécnico de Leiria; Centro de Ciências do Mar e do Ambiente (MARE); Centro em Rede de Investigação em Antropologia (CRIA)

Manila Clam - Current status, impact and fishing management in the Tagus estuary (PROMAR) (2014)

The major objective of this project is to develop a science based proposal for the regulation of a sustainable fishery of the Manila clam, *Ruditapes philippinarum* in the Tagus estuary. This objective will be achieved based on the following tasks: i) Determining the current status of the population of the Manila clam in the Tagus estuary, growth and reproduction, ii) estimate the fishing effort and value-chain for this species in Portugal, iii) identify the impacts of the occurrence of this invasive species and the impacts of fishing gears used in the Tagus estuary, iv) elaborate management proposals and v) raise awareness among stakeholders.

Program: Fisheries Program PROMAR **31-03-01-FEP161**

Funding: European Fisheries Fund

Proposing institutions: Direção-Geral de Recursos Naturais, Segurança e Serviços Marítimos (DGRM); Centro de Ciências do Mar e do Ambiente (MARE); Universidade de Évora; Instituto Português do Mar e da Atmosfera (IPMA); Centro em Rede de Investigação em Antropologia (CRIA)

PREVENTION

INTENTIONAL INTRODUCTIONS

Trichilogaster acaciaelongifoliae – a chalcid wasp of the order Hymenoptera, used to control *Acacia longifolia* in South Africa; the request for introduction was made in the beginning of 2012 by the joint research team of Escola Superior Agrária de Coimbra and Centro de Ecologia Funcional / Universidade de Coimbra. The process was presented for advice by the Portuguese phytosanitary agency (DGAV) who requested new information from the research team. After analyzing the complete process DGAV submitted it to the analysis of the EU phytosanitary council as it was the first time that this species was proposed for introduction in the EU. A favourable opinion was recently released by the EU phytosanitary council.

Anaphe inexpectatus – a parasitic wasp used to control the gum tree weevil (*Gonipterus platensis*) a defoliating insect from the Curculionidae family that feeds on *Eucalyptus* leaves. After some laboratorial essays the pulp sector afforestation companies started a program of experimental releases. Earlier this year ICNF asked the companies for a new assessment of the possible impact of the release of this species into the environment.

UNINTENTIONAL INTRODUCTIONS

During the period 2013-2014 the establishment was confirmed for the following alien species:

- *Ictalurus punctatus* - Channel catfish
- *Silurus glanis* – Wels catfish
- *Pectinatella magnifica* - a North American bryozoan
- *Vespa velutina nigrithorax* - Asian hornet

Until the moment there are no legal requirements to control these species through domestic legislation. The listing of these species under the revised national legislation will be considered. Asian hornet is under evaluation to be included in the first list of IAS of Union concern under the EU IAS regulation.

CONTROL AND ERADICATION

Foz Tua hydroelectric project (2009-...)

The Environmental Impact Statement of the hydroelectric dam project of Foz Tua issued on 11/05/2009 advocated the presentation of a plan for the control of aquatic invasive alien species (*Lepomis gibbosus*, *Procambarus clarkii*, *Pacifastacus leniusculus* and *Corbicula fluminea*) in the area affected by the project, as well as the implementation of planned measures that remain under this plan. The delivery of the control and eradication plan was settled for January 2012.

In addition to the above plan, the process of Foz Tua project provides measures for safeguarding of floristic communities of floodplains and actions to control invasive alien woody plants. In the directions for the future plan of the reservoir clearing should also be defined precautionary measures for transporting

alien woody invaders (eg, actions to prevent dissemination). It is also plausible that still may be recommended recovery of areas with current presence of invasive alien vegetation in the context of potential measures for terrestrial fauna and birds.

Fridão hydroelectric project (2010-...)

The Environmental Impact Statement issued on 30/04/2010 for the Fridão dam advocated the presentation of an analysis of the feasibility and effectiveness of implementing a plan to control aquatic invasive alien species in the area affected by the project.

Baixo Sabor hydroelectric project (2009-2013)

During the construction of the hydroelectric complex of Baixo Sabor it will be carried out an action to control the invasive alien species nuclei in the vicinity of the working areas. This job of removing alien species was started in 2009 (during the first year of construction) and will continue with a particular focus on nuclei with *Acacia dealbata* and with *Ailanthus altissima* until the end of the construction of the project (in 2013). Recently, following the results of the monitoring program of Flora, Vegetation and Habitats it was proposed, as a minimizing measure, to additionally extend this control to the nuclei of alien herbs, specifically *Phytolacca americana* and *Datura stramonium*. These nuclei can be being promoted by earthworks, so it is expected to have it controlled above the maximum level of the future reservoir.

Control of woody invasive alien species in national protected areas and national forests

In 2013-2014 ICNF intervened a total area of more than 300 hectares in northern and central Portugal with an average cost of more than 900 euros per hectare. Actions were directed to species of the genera *Acacia* and *Hakea* in order to control continuity and dispersal of these invasive trees.

Several techniques were used: manual taking of shoots from stumps and roots, and of seedlings resulting from seed germination; cutting and application to the cut surface of an aqueous solution of 33% glyphosate; planting hardwoods on high densities in clear cut areas.

In some of the areas it involved awareness actions with local communities (schools, local authorities, NGO's) and the support of volunteers.

LIFE Trachemys - Strategies and demonstrative techniques for the eradication of invasive turtles (2011-2013)

The introduction of alien species is a major problem for biodiversity conservation. In Europe, the case of alien aquatic turtles is of particular concern to indigenous species *Emys orbicularis* (European pond turtle) and *Mauremys leprosa* (Spanish pond turtle). The project LIFE + Trachemys was developed in 17 wetlands in Valencia Generalitat and Portugal.

In Portugal the catches of animals were held in four ponds: Loulé, Lagoa do Garão, Lagoa das Dunas Douradas, Lagoa de São Lourenço e Lagoa da Quinta do Lago Sul. The captured turtles were forwarded to the RIAS rescue center in Olhão and Gaia Biological Park.

The main goals of the project were:

- to decrease the loss of aquatic biodiversity due to the presence of alien turtles, especially *Trachemys scripta*,
- to create a strategy for the eradication of wild populations of alien invasive turtles,
- to protect the existing populations of native amphibians and turtles,
- to develop specific regulations to prevent the trade and use of invasive turtles as pets and their release into the wild,
- to raise public awareness about the problems caused by the release of alien species into the wild in order to avoid this so usual practice,

- to implement the proposed methodology and techniques in pilot areas to demonstrate its suitability and viability.

Funding: LIFE+ Biodiversity

Proposing institutions: Generalitat Valenciana (Conselleria de Medi Ambient); CIBIO-ICETA (Centro de Investigação em Biodiversidade e Recursos Genéticos - Instituto de Ciências e Tecnologias Agrárias e Agroalimentares - Universidade do Porto)

Other participants: Parque Biológico de Gaia; ALDEIA-RIAS (Centro de Recuperação e Investigação de Animais Selvagens - Ria Formosa).

Total funding: 1,200,754 €

Monitoring plan of the fish fauna in Vale do Guadiana Natural Park (2007-...)

Started in 2007 it includes the control of alien fish species in river Vascão sub-basin (Guadiana basin). Catches of alien species are held once a week during August, September and October, and focus primarily on the existing river pools. Usually, specimens of three fish species are captured (*Lepomis gibbosus*, *Micropterus salmoides* and *Australoheros facetus*) as well as specimens of the Louisiana crayfish (*Procambarus clarkii*).

Eradication plan for *Xenopus laevis* in the streams of Oeiras municipality area (2010 - ...)

Started in 2010, it is aimed to eradicate *Xenopus laevis* (Daudin, 1802), the African clawed frog, in the streams of Laje and Barcarena (Oeiras), and it's screening in adjacent watercourses. Annual reports are being produced.

Proposing institutions: ICNF, Oeiras municipality, Centro de Biologia Ambiental / Faculdade de Ciências da Universidade de Lisboa and Instituto Gulbenkian de Ciência.

National program of action for the control of the pine wood nematode (*Bursaphelenchus xylophilus*)

Forest phytosanitary measure aiming at the removal of conifer trees host to the pine wood nematode and its transportation for disposal of the respective surpluses that must be eliminated by chipping or burning. Originating in the USA, the pine wood nematode endangers national pine forests and, consequently, the actions of removal of the affected pine trees can also disrupt the occurrence of other native species, such as *Armeria rouyana*, *Santolina impressa* and *Thymus capitellatus*, by reducing the area of suitable habitat.

Funding: PRODER (Subaction 2.3.3.3 – Protection Against Noxious Biotic Agents).

Project Cabeço Santo (Serra do Caramulo) (2006-...)

The main goal was to carry out actions that promote biodiversity and minimize the damages caused by the presence of invasive species associated with the occurrence of fire, namely *Acacia dealbata* and *Acacia longifolia*.

Proposing institution: Quercus (NGO).

LIFE+ BRIGHT - Bussaco's Recovery from Invasions Generating Habitat Threats (2011 - 2016)

This project, developed at Buçaco National Forest aims the recovery of local habitats, through the implementation of a set of integrated actions of control/eradication of exotic species, propagation and plantation of autochthonous plant species and active involvement of stakeholders (schools, local communities, visitors and private sector).

LIFE+ Biodiscoveries - Invasive species control through public participation (2014 - 2019)

Considering the experiences of other LIFE projects, the aim is to develop an alternative to traditional models of invasive species' control combining public participation and a strong support of volunteers.

LIFE+ INVASEP - Combating Invasive Species Within the Tagus and Guadiana River Basins in the Iberian Peninsula (2012-2016)

This Iberian project aims, among other, to establish a basis for Iberian cooperation on the fight against invasive alien species, including the development of a Strategy and an Action Plan and to proceed with the control/eradication and prevention of introduction of alien species to the Tagus and Guadiana river basins.

One of the actions under this project was the preparation, by the end of 2014, of two mobile stations for boat cleaning/disinfection to prevent the introduction of zebra mussel to the Alqueva dam reservoir (one of the largest dams and artificial lakes in Europe, located on the Guadiana river basin).

Control of the Asian hornet (*Vespa velutina*) in the Northwestern Portugal

Since 2013 the municipalities in the north-western part of the country, with the support of beekeepers' associations and the local civil protection structures, started to destroy the summer nests of the Asian hornet. In 2014 ICNF together with DGAV (national authority for animal and plant health) and INIAV (national research laboratory for agriculture and veterinary) started working on an action plan to tackle the growing problem of dissemination of the species. This plan was only finished by the end of 2014 and presented to the public in January 2015.

ICNF and DGAV share the responsibility for the general coordination of the plan, while ICNF is also responsible for the information management (an online platform was created to register all the sightings of specimens or *Vespa velutina* nests) and DGAV is the responsible for the coordination of training programs and information/dissemination. The municipalities take care of the destruction of the nests while INIAV is responsible for the setting of an active system with sentinel apiaries to monitor the dispersal of the species and for the general scientific support.

MADEIRA

A program on control and eradication of invasive plants and restoration of natural ecosystems, (especially in protected areas) has been developed in Madeira autonomous region.

Regional legislation prohibits afforestation and reforestation activities with fast growing species exploited in short revolutions, including some invasive species such as wattles (*Acacia* spp) and incense-tree (*Pittosporum undulatum*).

The eradication of wild rabbit and mice in Bugio (Desertas Islands Natural Reserve) allowed an increase in vegetation cover in the intervened area, allowing the reappearance of several plant species. There was also a reduction of predation on the eggs of Desertas' Petrel (*Pterodroma desertas*). The eradication of wild rabbit in the Ilhéus de Cima e de Baixo islets (Porto Santo) allowed an increase in vegetation cover in the intervened area, while the elimination of mice in the Ilhéu de Baixo islet (Porto Santo) allowed an increase in abundance and distribution area of the terrestrial mollusc *Idiomela subplicata* (priority species under the Habitats Directive).

Actions to eradicate invasive alien species were planned under several LIFE projects:

“Ilhéus do Porto Santo”, RECOVER NATURA, “Fura-bardos” and “Maciço Montanhoso”. The *Serviço do Parque Natural da Madeira* continues these actions in a variety of nature reserves and protected areas which it has under its jurisdiction

Another component of these projects, considered to be equally important, is the awareness of local communities. This is one of the key measures to prevent the introduction of alien species. Accordingly, talks have been held at schools with training courses on invasive plants targeted at elementary school teachers, elected officials and farmers. The awareness of managers and users of natural spaces as well as to stakeholders on the production and sale of plants and other living beings is an asset for the control of alien species in island ecosystems.

AZORES

The Regional Government of Azores approved in 2004 the Regional Plan for the Eradication and Control of Invasive Plant Species in Sensitive Areas (PRECEFIAS) 2004-2009, whose aim was the eradication and control of sixteen species of invasive plants in sensitive areas on all islands of the archipelago.

This legal measure was strengthened by the publication of further regional legislation like the one that established the legal figure of Island Natural Park (“Parque Natural de Ilha” – PNI), having been created since 2008, natural parks on the 9 islands of the archipelago. All the diplomas creating the natural parks establish restrictions to the use/introduction of alien species.

In Azores region the legal regime of nature and biodiversity conservation establishes rules on import, holding and introduction into the environment of alien species, identifies plant and wildlife alien species known as invasive or with recognized ecological threat and indicates the priority *taxa* for control/eradication.

Regional administration proceeds to the control of invasive plants in sensible areas of all Azores islands and from 2011 to 2013 the intervened area was around 1,200 hectares.

The promotion and environmental awareness initiatives regularly organised by the PNI seek to involve the different sectors of the public on biodiversity issues. Some examples of activities are lectures and meetings for the general public, themed contests, interpretive tours, and also initiatives with direct action as bird censuses, plantation of endemic species and removal of invasive species in protected areas.

Work on restoration of natural habitats and sensitive areas has been carried out, including the control of invasive species and, where necessary, the plantation of native species, propagated in public nurseries.

The LIFE Project Sanctuary Islands for Seabirds (2009-2013), pioneered for the conservation of seabird colonies in the Azores, through habitat restoration and the adoption of measures for control/eradication of invasive alien species.

SERBIA / SERBIE

REPORT ON THE IMPLEMENTATION OF THE RECOMMENDATIONS NO. 167 (2013) AND NO. 170 (2014) ON INVASIVE ALIEN SPECIES IN SERBIA

Implementation of the Recommendations on invasive alien species in Serbia integrates into strategies and legislation frame including obligations taken under all relevant international agreements and proposals received by all relevant technical and scientific institutions.

With this regard, several important activities have been started and they are in progress to improve legislation, monitoring and research on invasive alien species in Serbia.

1. The legal framework is provided for taking measures to implement these recommendations

- The National Strategy on Sustainable Use of Natural Resources and Goods (2012-
- The National Environmental Protection Programme (2010-2019)
- The Strategy on Biological Diversity of the Republic of Serbia (2011-2018)
- The Law on Nature Protection ("Official Gazette of RS", No 36/09 , 88/2010 and 91/2010-corr)
- The Law on Plant Wealth ("Official Gazette of RS", 41/09)
- The Law on Protection and Sustainable Use of Fish Stock ("Official Gazette of RS", No 36/09)
- The Law on Cattle Breeding ("Official Gazette of RS", No 41/09, 93/12)
- The Animal Welfare ("Official Gazette of RS", No 41/09)
- Rulebook on the list of harmful organisms nad lists of plants, plant production and regulated objects ("Official Gazette of RS", No 7/10),

In accordance with the Strategy on Biological Diversity of the Republic of Serbia and Action plan (2911-2918) some administrative, scientific and technical activities on Managing Threatening Processes have been realised, including:

- Identification indicators for monitoring the status of Alien species and their impacts on biological diversity,
- Development of biological and other methods for the control and eradication of Alien species of concern,
- Establishment of control over exotic species breeding centres, implement the marking of animals and ban the entry of exotic species that can become invasive, and
- Establishment of Alien species warning system and procedures for responding to threats caused by such species.

Strategy of Biological Diversity of the Republic of Serbia for the period 2011 – 2018 is currently being revised, and the adoption thereof is expected in 2015.

In accordance with Article 82 of the Law on Nature Protection, regulates Introduction of Invasive Alien Species.

The Ministry issued the permit on the basis of the Acceptability Study and Nature Impact Assessment Study, with the approval of the Ministry responsible for agriculture, forestry and water management.

Introduction of Alien Species is possible on the basis of permit issued by the Ministry through a ruling, upon previously obtained opinion from the Institute for Nature Protection or other authorised

scientific and professional organisation, expressing that there is no danger for Alien Species in case of accidental or intentional escape of specimens into the free nature of the Republic of Serbia.

2. Report on Implementation of the Recommendation No. 170 (2014) on the European Code of Conduct on Recreational Fishing and Invasive Alien Species

In accordance with Article 30 of the Law on Protection and Sustainable Use of Fish Stock ("Official Gazette of RS", No 36/09), the prohibition of the introduction of alien fish species regulated as follows

- It is not allowed to bring non-native species of fish in the water fishing
- It is not allowed to bring fish species from the regional remote geographic areas as well as species originating from geographically closer, but mutually isolated basins.

Penalties regulated by this Law (Art. 58 and 59) such as Economic offense and violations.

In accordance with Article 23 of the same Law, Draft Order on measures for conservation and protection of fish stock has been prepared and will be established by the Minister for Agriculture and Environmental Protection until July 2015.

Measures within this Order include fishing invasive species within the recreational and commercial fishing as follows:

While performing recreational and commercial fishing is allowed unrestricted harvesting of all alien species of fish such as: *Arystichthys nobilis*, *Hypophthalmichthys molitrix*, *Ctenopharyngodon idella*, *Ameiurus melas* and *Ameiurus nebulosus*, *Lepomis gibbosus*, *Pseudorasbora parva*, *Perccottus glenii*, *Micropterus salmoides*, *Carassius gibelio*, *Oncorhynchus mykiss*, *Salmo letnica*, *Salvelinus alpinus*, *Salvelinus fontinalis*, all spp *Neogobius* and *Syngnathus abaster*.

3. Follow up activities

By Law on Invasive Alien Species have been considered and will be established in accordance with Article 82 of the Law on Nature Protection

4. Results of the recent observation and research activities in the field of invasive alien species in Serbia

In accordance with the Report on IAS of the scientific institutions, research work is being implemented in two main directions:

1. Research on biology and ecology of invasive alien plant species

Within the basic biological and ecological research, since 2006 to conduct research species which have a negative impact on human health: *Ambrosia artemisiifolia* L., *A. trifida* L., *Iva xanthifolia* Nutt. i *Helianthus* spp.

2. List of invasive alien plant species, defining the status and recognition of ways to introduce the aim of preventing the introduction and spread

In the framework of the national project is carried out mapping of all invasive species in Serbia and the Balkan Peninsula (localities, population status, habitat types).

The Lists of invasive species Vojvodina: published in 2013 as scientific paper.

Projects are under implementation

- 2012-2016 "COST Action FA1203: Sustainable management of *Ambrosia artemisiifolia* in Europe (SMARTER)"
- 2013-2017 "COST Action TD1209: European Information System for Alien Species (Alien Challenge)

Planned Projects:

- 2015-2016 East and South European Network for Invasive Alien Species – a tool to support the management of alien species in Bulgaria, co-funded by the EEA FM. This project will be realized by the Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences (IBER-BA) and the University of Novi Sad Faculty of Science for activities in Serbia.
- 2015, Mapping the terrain ragweed and other allergic plants, laboratory and field studies and monitoring:

Adding activities

Danube Region Invasive Alien Species Network (DIAS) is established, including International Association of Danube Research (IAD), East and South European Network of Invasive Alien Species (ESENIA) and independent experts / researchers who deal with invasive alien species

References:

Report on previous work in the field of "Invasive alien plants" made by the University of Novi Sad Faculty of Science, Laboratory of invasive allergic plants, Novi Sad.

Prepared by Snezana Prokic, Focal Point for Bern Convention
Belgrade, 23th May 2015.

SLOVENIA / SLOVÉNIE

REPORT ON ACTIVITIES ON INVASIVE ALIEN SPECIES (2013-2015) REPUBLIC OF SLOVENIA

Legislation

In the year 2015 the EU Regulation 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species entered into force.

Management

In April 2015 the Natura 2000 Management programme for Slovenia for the period 2015 - 2020 has been adopted (<http://www.natura2000.gov.si/index.php?id=330>). In the programme management measures that address IAS are foreseen where it was identified that IAS might prevent maintenance or reaching of the favourable status of Natura 2000 species or habitat types.

Management of IAS is included in yearly management programs of public authorities managing state protected areas and in the management program of the Institute of the RS for nature conservation. Due to the financial constraints management of IAS is often linked to financing through projects (mostly from the EU financial sources), which is not assuring a continuation of work.

In preparation for the implementation of the Regulation (EU) 1143/2014 of the European Parliament and of the Council on the prevention and management of the introduction and spread of invasive alien species the Ministry of the environment and spatial planning financed a study to identify IAS that should be addressed primarily on a national level and to identify pathways of introduction of IAS. In this study also management of waste products of removed IAS plant material is analysed and best practices are looked upon.

Activities including management of IAS will be supported in accordance with the national operational programmes prepared under the new EU financial perspective for period 2014 - 2020. Sources could be provided for nature conservation projects addressing IAS in accordance with the national Operational programme for *European Maritime and Fisheries Fund (EMFF)* (in preparation) and for the Cohesion policy.

In the project WETMAN (<http://www.wetman.si/about-the-project/project-wetman>) six Slovene wetlands were restored and their conditions were improved. One of the actions was to remove alien fish species that threatened native freshwater turtle *Emys orbicularis* from the Natura 2000 site Gornji kal.

There are several ongoing biodiversity conservation projects financed under the Norway and EEA grants. All of the approved projects include some kind of management of IAS. In the project GoForMura (<http://goformura.gozdis.si/>) invasive tree species will be removed with the aim of improving the unfavourable status of selected riparian forest habitat types. In the project Ljuba (<http://www.ljuba.si/en/about/project-ljuba/>) different methods for eradication of the invasive alien plant species the Canadian goldenrod and Giant goldenrod will be tested. Invasive alien plant species will also be removed in the project Gorički travniki (http://www.park-goricko.org/sl/informacija.asp?id_meta_type=52&id_jezik=0&id_language=0&id_informacija=676) in order to improve several grassland habitat types.

Raising awareness

There was a successful conclusion of the projects Amc promo BID (<http://www.bc-naklo.si/~amc/slo.html>). The aim of this project was to involve honey producers in the prevention of biodiversity loss through research of the influences of IAS on native bee *Apis mellifera carnica*. This was

a bilateral project between Slovenia and Austria. Besides activities in the field (monitoring of IAS, eradication experiments) several workshops were organised where IAS issues were introduced to participants, followed by the exchange of ideas. Among other, it was discussed how the use of meliferus invasive plants could be replaced by the use of native meliferus plants or by introducing different agriculture practices (for example growing of buckwheat in autumn) and how selected interest groups such as bee keepers could contribute towards the prevention of introduction and spread of IAS. Due to this project awareness on IAS within the beekeeping organisations have risen, which could be seen in their further activities. As there are still some complaints from beekeepers when meliferus IAS are removed, further communication work is planned.

Ministry has financed several workshops for municipality workers dealing with management of green areas. During the workshop participants were informed about IAS with emphasis on common plant IAS present in their regions. Possible management options have been discussed together with experiences from the participants. This kind of workshop was also organised for personnel managing green areas along state roads, highways and railways.

At the webpage of the Ministry of the environment and spatial planning a dedicated page on IAS is maintained with general information on IAS and more detailed information on several species. Contact to relevant institutions are provided as well as advice how an individual can contribute toward prevention of introduction and spreading of IAS (http://www.mop.gov.si/si/delovna_podrocja/narava/invazivne_tujerodne_vrste_rastlin_in_zivali/). Under the news section also volunteer actions for eradication of IAS and different events linked to the IAS could be followed.

Slovenian national television prepared documentary broadcast on invasive alien plants, IAS were also presented in several other broadcasts, including daily news, and there is also coverage of IAS related topics in other media.

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SPAIN / ESPAGNE



SECRETARÍA DE ESTADO
DE MEDIO AMBIENTE

DIRECCIÓN GENERAL DE CALIDAD Y
EVALUACION AMBIENTAL Y MEDIO NATURAL

REPORT

FOR THE 11TH MEETING OF THE GROUP OF EXPERTS ON INVASIVE ALIEN SPECIES OF THE BERN CONVENTION

Triglav NP (Slovenia), 04-05 June 2015

Introduction

The growing demand for species and their globalized trade is producing an increasing entry of invasive alien species, which pose one of the major threats to native species, habitats or ecosystems, agronomy and the associated ecosystem services and resources or the public health.

It is therefore necessary to establish certain controls on invasive alien species by legislation, both at national level and European level.

In Spain the Law on the Conservation of the Natural Heritage and Biodiversity from 2007 creates the “*Spanish Catalogue of Invasive Alien Species*” dependent on the Ministry of Agriculture, Food and Environment. Chapter III of this legislation focuses on the growing problem of invasive alien species due to globalization. This National Catalogue was first published on November 2011 and modify afterwards by the publication of the *Act 630/2013, 2nd August, which regulates the catalogue of invasive alien species* (<http://www.boe.es/boe/dias/2013/08/03/pdfs/BOE-A-2013-8565.pdf>)

The publication of *Regulation (EU) No 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species* has meant a boost to the policy earlier developed in Spain.

Legal Framework

The Spanish Catalogue of Invasive Alien Species was published by Act 630/2013, of 2nd August. It includes 181 taxa (including species, genera and families). For each of these taxa the Catalogue specifies the geographic scope, mainly differentiating Canary and Balearic Islands from the peninsula. Thus recognise the importance that invasive alien species pose on particularly vulnerable habitats and ecosystems (i.e. islands).

Implementing national legislation is currently on going.

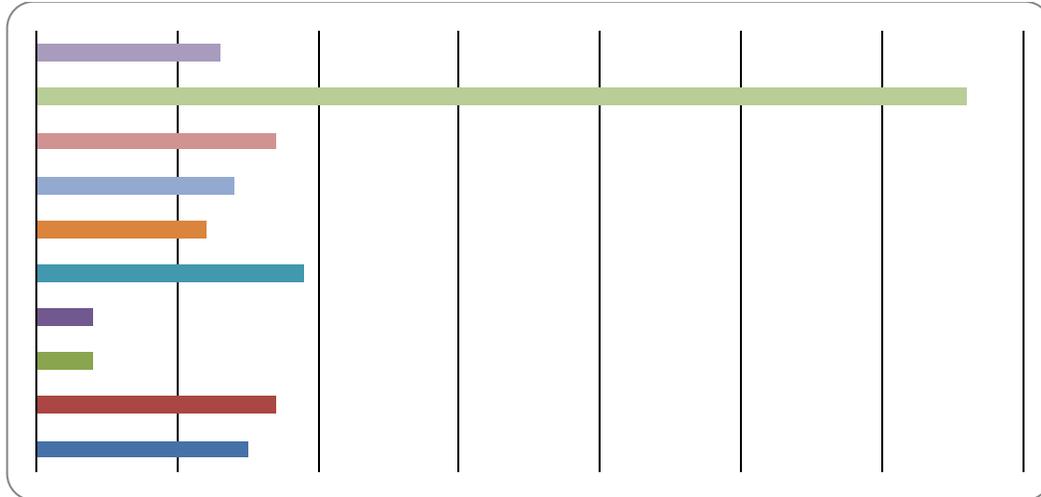


Figure. Distribution by major taxonomic groups of taxa included in the Catalogue

The Ministry of Agriculture, Food and Environment has been very active in promoting European Regulation on invasive alien species, overseeing and coordinating its implementation in Spain.

In relation to the implementation of the *Regulation (EU) No 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species* the Ministry of Agriculture, Food and Environment is coordinating the identification of competent authorities in charge of applying this Regulation. First coordination meeting was held on 3rd March 2015 with different Ministries and Regional Authorities.

Spain is also working on risk assessments and has proposed the Commission some risk assessments on different invasive alien species to be included in the list of species of Union concern.

Prevention

To facilitate coordination and communication between competent authorities of the Autonomous Communities and the State an Alert Network for surveillance of invasive alien species has been created.

In compliance with the provisions of Article 14 of Act 630/2013, of 2nd August, Andalusia has created the Andalusian Early Warning Network of Invasive Alien Species (<http://www.juntadeandalucia.es/medioambiente/site/porta/web/menuitem.7e1cf46ddf59bb227a9ebe205510e1ca/?vgnextoid=3cc25f621505c110VgnVCM1000001325e50aRCRD&vgnextchannel=7b5cb2c42f207310VgnVCM2000000624e50aRCRD>). The purpose of this network is to serve as a territorial network that collects, as soon as possible, information on the emergence of new exotic species in Andalusia, or the appearance of alien species known to Andalusia in places where they have never been cited before (first record). Some other Autonomous Regions have also carried out similar platforms (i.e. Autonomous Region of Aragón: http://www.aragon.es/DepartamentosOrganismosPublicos/Departamentos/AgriculturaGanaderiaMedioAmbiente/AreasTematicas/MA_Biodiversidad/EspeciesExoticasInvasoras/ci.04_DETECCION_TEMP_RANA.detalleDepartamento?channelSelected=4ab736552883a210VgnVCM100000450a15acRCRD).

The collaboration between the Deputy Direction of Nature and the Deputy Direction of Health Agreements and Border Control, both in the Ministry of Agriculture, Food and Environment, is allowing the evaluation prior import of species traded as pets. Next 18th June there will be training on invasive alien species for customs officers focus on legal status of invasive alien species and their identification.

It has carried out training on invasive alien species for both environmental agents and to SEPRONA agents (The Nature Protection Service (Servicio de Protección de la Naturaleza –

SEPRONA- is a unit of the Spanish Civil Guard responsible for nature conservation and management of the hunting and fishing industry).

Control and eradication

In compliance with article 15 of Act 630/2013, of 2nd August, the Sectorial Conference on Environment approved on 16th April 2015 the Strategy on management, control and possible eradication of the Asian Hornet or yellow-legged hornet (*Vespa velutina*) (<http://www.magrama.gob.es/es/biodiversidad/publicaciones/pbl-fauna-flora-estrategias-eei-vespa.aspx>).

Also the Strategy on management, control and possible eradication of the American mink (*Neovison vison*) was approved by Sectorial Conference on Environment last 7th October 2013 (http://www.magrama.gob.es/es/biodiversidad/publicaciones/pbl_exo_inva_vison_americano_tcm7-329814.pdf).

The Ministry of Agriculture, Food and Environment is collaborating with racoon (*Procyon lotor*) control in different regions to evaluate different tramps and evaluate best methodologies.

The Autonomous regions who have the competence on invasive alien species management are working on different species depending on territorial priorities (*Aedes albopictus*; *Pomacea* spp.; *Procambarus clarkii*; *Neovison vison*; *Vespa velutina*; *Dreissena polymorpha*; *Trachemys* spp.; *Procyon lotor*; *Nasua nasua*; *Lampropeltis getula*; *Sinanodontia woodiana*; *Corbicula fluminea*; *Potamocorbula amurensis*; *Rhynchophorus ferrugineus*; *Cherax destructor*; *Pacifastacus leniusculus*; *Alburnus alburnus*; *Ameiurus melas*; *Esox lucius*; *Gambusia holbrooki*; *Micropterus salmoides*; *Pseudorasbora parva*; *Salvelinus fontinalis*; *Silurus glanis*; *Sander lucioperca*; *Chrysemys picta*; *Amandava amandava*; *Coturnix japonica*; *Estrilda* spp.; *Euplectes* spp.; *Leiothrix lutea*; *Myiopsitta monachus*; *Oxyura jamaicensis*; *Ploceus* spp.; *Psittacula krameri*; *Pycnonotus cafer*; *Pycnonotus jocosus*; *Quelea quelea*; *Myocastor coypus*; *Ondatra zibethicus*; *Acacia dealbata*; *Acacia farnesiana*; *Acacia salicina*; *Agave americana*; *Ageratina adenophora*; *Ageratina riparia*; *Ailanthus altissima*; *Ambrosia artemisiifolia*; *Arundo donax*; *Azolla* spp.; *Buddleja davidii*; *Calotropis procera*; *Carpobrotus acinaciformis*; *Carpobrotus edulis*; *Centrantus ruber*; *Cylindropuntia* spp.; *Eichhornia crassipes*; *Eschscholzia californica*; *Fallopia japonica*; *Heracleum mantegazzianum*; *Hydrocotyle ranunculoides*; *Nymphaea mexicana*; *Opuntia dillenii*; *Opuntia máxima*; *Opuntia stricta*; *Oxalis pes-caprae*; *Pennisetum clandestinum*; *Pennisetum purpureum*; *Pennisetum setaceum*; *Pennisetum villosum*; *Salvinia* spp.; *Spartina alterniflora*; *Spartina patens*; *Tradescantia fluminensis*; *Cortaderia* spp.; *Baccharis halimifolia*).

The Ministry of Agriculture, Food and Environment coordinates through a working group all the activities and implementation of regulations, including the development of national strategies.

Among other activities carried out by different administrations, as an additional support to the normal development of eradication activities by competent authorities, which also include an important part of prevention (education campaigns, awareness ...) we can find different Life Projects.

There are, or have been during last two years, different LIFE projects related to IAS management and control:

- LIFE INVASEP- LIFE/NAT/ES/000582 Project “Combat invasive species in the Tajo and Guadiana drainage basins in the Iberian Peninsula”.
- LIFE TRACHEMYS - LIFE09 NAT/ES/000529. “Demonstration strategy and techniques for the eradication of invasive freshwater turtles”.
- LIFE LAMPROPELTIS - LIFE10 NAT/ES/565 AG11-003 “Control of the invasive alien species *Lampropeltis getula californica* on the island of Gran Canaria”.

- LIFE project: Restoration of habitats of Community interest in estuaries of the Basque Country - LIFE08NAT/E/000055. Includes control and eradication of *Baccharis halimifolia*.
- PROJECT ESTANY. Programme LIFE+. Improvement of the habitats and species of the Natura 2000 in Banyoles: a demonstrative project. LIFE 08 NAT/E/000078.
- LIFE+ Environmental Recovery of the River Territory: a vital area for the European Mink (*Mustela lutreola*) | LIFE+ MINK TERRITORY. This project includes plants control.
- LIFE LUTREOLA SPAIN/ LIFE13 NAT /ES/001171 “New approaches for the European mink Conservation in Spain” One of its purposes is the eradication of American mink established within the range of European mink and in risk zones.
- LIFE+ RIPISILVANATURA -LIFE13 BIO/ES/1407.
- LIFE Potamo Fauna - LIFE12 NAT / ES / 001091. “Conservation of river fauna of European interest in the Natura 2000 network in the basins of the rivers Ter and Muga”. Includes control of exotic turtles.

Awareness and training

On the 18th December 2013 was held in Madrid the Conference on Invasive Alien Species in urban areas organized by the Ministry of Agriculture, Food and Environment and the Spanish Federation of Municipalities and Provinces. All the information can be consulted in: http://www.magrama.gob.es/es/biodiversidad/formacion/Jornada_Especies_Exoticas_medio_urbano.aspx

The Ministry of Agriculture, Food and Environment is co-financer of the LIFE Project 10 NAT / ES / 000 582 "Fight against invasive species in river basins of the Tagus and Guadiana rivers in the Iberian Peninsula" (LIFE INVASEP). As part of this project a code of conduct to prevent trade in invasive alien fauna has been published. This document is the result of discussions with representatives of the sector. It can be downloaded in: http://www.magrama.gob.es/es/biodiversidad/temas/conservacion-de-especies/Cod_Conducta_EEI_tcm7-360005.pdf

Next September 2015 Spanish National Conference on Invasive Alien Species will take place in Asturias (<http://congresoeei2015.wix.com/eei-2015>).

The Nature Conservation and Protected Areas Service of Government of Extremadura will participate on the Green Week 2015 Nature (<http://www.greenweek2015.eu/programme-20150604-5-1.html>). Addressing the youth - the government of Extremadura (Spain) is focusing its awareness-raising on children, knowing that children begging their parents for exotic pets are an important cause of introduction of invasive alien species.

Network of national parks (the Autonomous National Parks Body of Spain) held in 2014 the first "Seminar of invasive alien species in the network of national parks". All lectures can be downloaded from: <http://www.magrama.gob.es/es/ceneam/grupos-de-trabajo-y-seminarios/red-parques-nacionales/especies-invasoras-exoticas1.aspx>

The Department of Agriculture and Environment of the Government of Aragon prepared a seminar dedicated to the knowledge of the apple snail pest on 19th September last year. This seminar intended to raise awareness of this species which has caused problems in the rice fields and river in the Delta del Ebro, its legal framework and the measures that are being implemented in Aragon.

The State Ports Body organized in February 2015 a training workshop on the Convention on Ballast Water Management (BWMC) for the experts of the body. This conference linked the implementation of the convention and prevention of introduction of invasive alien species.

Various training materials for schools have been developed over the years.

The waters of the Segura River are a complex ecosystem where exotic species have been established and in many cases pose a threat to native species. Combating this process is a challenge which experts discussed the matter on 27 and 28 January in Murcia in the conference 'invasive alien species in the riparian area'. The activity is part of the project Life + Riposilvanatura leading by the Segura river basin (Ministry of Agriculture, Food and Environment) with ANSE partners, University of Murcia, Autonomous Region of Murcia and the municipalities of Cieza and Calasparra and with the co-financing of the European Union. All the conferences can be downloaded. (<http://www.chsegura.es/chs/cuenca/seguraripisilvanatura/jornadaeei.html>).

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SWEDEN / SUÈDE



SWEDISH ENVIRONMENTAL PROTECTION AGENCY

SWEDEN COUNTRY REPORT ON INVASIVE ALIEN SPECIES TO THE BERN CONVENTION 2015

Background

In Sweden, 2233 alien species and populations have been reported. Of these, about 10 % are native species that have been translocated to another part of the country, outside of their natural distribution and where they have never occurred naturally. 388 have been identified as invasive alien species, that cause harm to biological diversity and can in many cases also harm health, social and socioeconomic values. Another 82 species have been identified as potentially invasive species, that is, they are known to be invasive in other countries or regions, but have not as yet been observed to cause damage in Sweden.

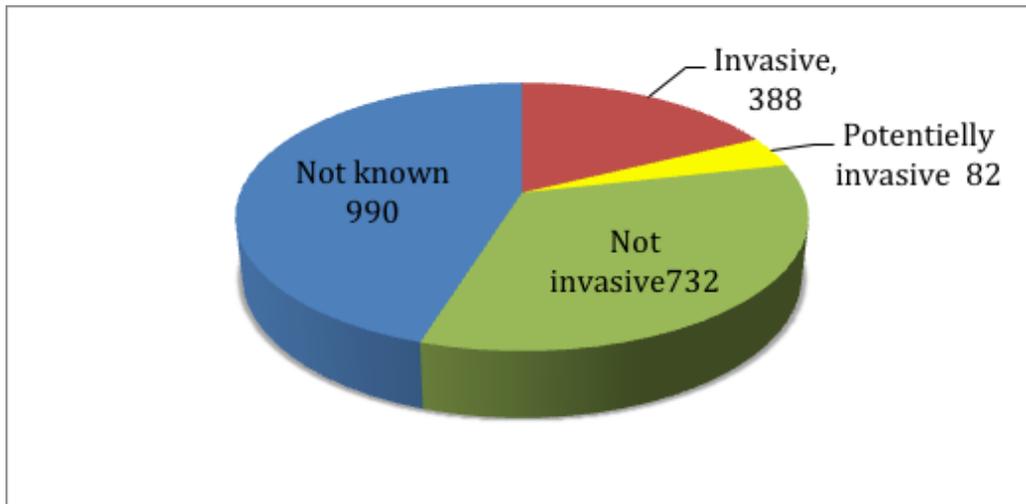


Figure 1. Number of alien species in Sweden. Source: NOBANIS www.nobanis.org Date of access 2014-10-16

The number of invasive alien species is steadily increasing in all habitats in Sweden. Even if invasive alien species are most common in habitats that are influenced by people, the greatest effects on biological diversity are greatest in habitats such as grass and heathlands, coastlands, islands and lakes and streams.

Strategies and Action Plans, Legislation

The Swedish National Strategy and Action Plan for Invasive Alien Species (Naturvårdsverket 2008) was updated in 2014 to bring it into alignment with the European Union Regulation No. 1143/2014 on the prevention and management of the introduction and spread of invasive alien

species. This revised action plan provides a road map for implementing the EU IAS regulation. Further studies are in progress to propose legislative changes that are required to implement the regulation.

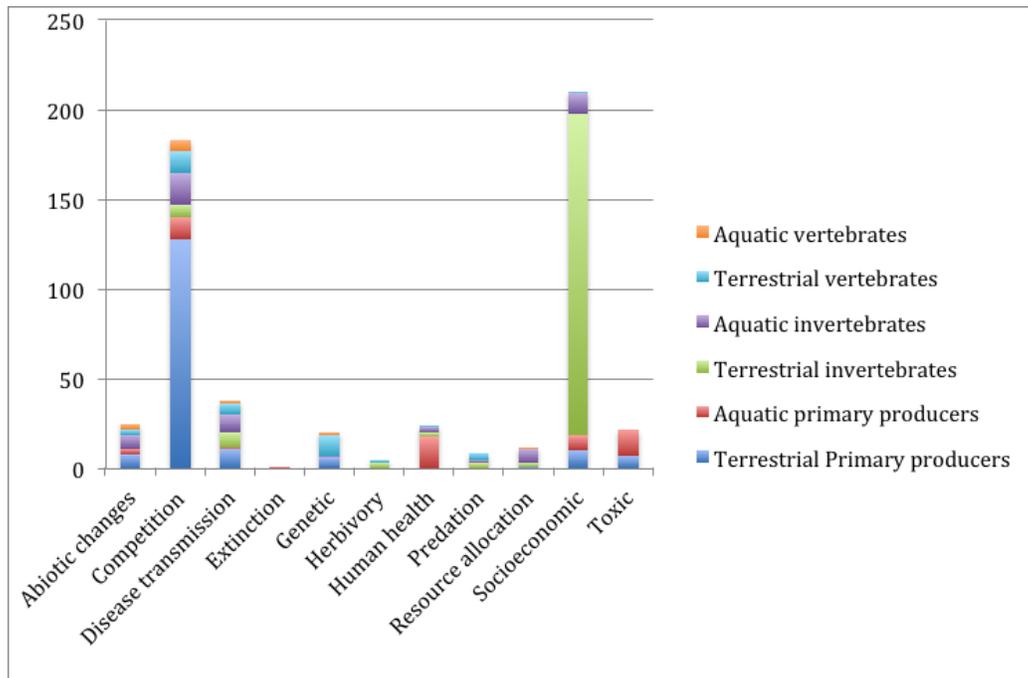


Figure 2. Ecological effects of invasive alien species on the biological diversity of Sweden. Swedish Action Plan for Invasive Alien Species, 2014. Unpublished report.

Early Warning and information exchange

Sweden continues to actively support the development of the NOBANIS network (European Network on Invasive Alien Species). Sweden's data on invasive alien species is accessible through NOBANIS. Sweden is together with Denmark a coordinator of the network. Sweden is also responsible for providing technical support and maintaining the NOBANIS gateway, which is hosted at the Swedish Species Information Center. Sweden has provided funding and technical expertise for the reprogramming of the gateway in 2014.

NOBANIS has further developed the Species Alert function for northern Europe, which serves as a simple Early Warning. About 15 species alerts have been posted on NOBANIS.

Citizen Science reporting for invasive alien species within the Swedish Species Reporting System www.artportalen.se is being improved in the new system. At present individual alien species can be reported and retrieved by species name, but are not tagged as alien or invasive alien species. Ongoing species specific Citizen Science reporting projects to gather observations include the Round goby *Neogobius melanostomus* and the Zebra mussel *Dreissena polymorpha*.

The gateway *Alien Species in Swedish Seas and Coastal Areas* www.frammandearter.se is once again active and under development after two years inactivity.

Monitoring and surveillance

The project "Management of the invasive Raccoon Dog (*Nyctereutes procyonoides*) in the north European countries" is now funded nationally since the end of the LIFE+ project in 2013. Norway, Denmark, Finland and Sweden continue to monitor the raccoon dog and eradicate them when found. About 200 raccoon dogs have been eradicated in Sweden since the start of the project in 2010. An added value of the raccoon dog project is the detection of raccoon in Southern Sweden and

subsequent removal in 2013. The methods used in the project, phototraps, tracking and either eradication or sterilization and tagging with a radio sender in order to find other raccoon dogs (Judas sender) have a great potential for use in monitoring of other invasive alien predators,

Control

Local programs are in place to control the spread and impacts of the American mink *Neovison vison* from the Stockholm, Umeå and Gotherberg archipelagos. Other control programs are for the Japanese rose *Rosa rugosa* along beaches in Southern Sweden, the Giant hogweed *Heracleum mantegazzianum*, the Japanese knotweed *Reynoutria japonica* and the Fringed water lily *Nymphoides peltata*.

SWITZERLAND / SUISSE

OVERVIEW OF IAS WORK IN SWITZERLAND CONTRIBUTION TO THE MEETING OF THE GROUP OF EXPERTS ON IAS IN TRIGLAV NATIONAL PARK, (SLOVENIA), JUNE 2015

By Dr. Gian-Reto Walther, Federal Office for the Environment, Switzerland

The work on invasive alien species in Switzerland over the last two years was dominated by the elaboration of a national strategy on invasive alien species in Switzerland. The work is based on a parliamentary intervention that requires from the federal council:

- to elaborate a 'national strategy for the containment of invasive alien species', and
- to present the needs to adapt the national legislation.

The strategy on invasive alien species takes up the strategic target with regard to invasive alien species as formulated in the national biodiversity strategy and further develops the targets and measures in terms of the basics for as well as the prevention and control of invasive alien species.

A draft report to the parliamentary intervention and the extended document of a national strategy on invasive alien species in Switzerland will soon be submitted to the other federal offices concerned with the impacts of invasive alien species for a first consultation. After having heard the cantons and other relevant stakeholders, the documents will pass a second consultation in the federal offices before being submitted to the federal council. The entire process shall be finished by the end of this year.

Apart from the work on the national strategy, the implementation on the existing national legislation, in particular, the Ordinance on the Handling of Organisms in the Environment (Release Ordinance, SR 814.911; http://www.admin.ch/ch/e/rs/c814_911.html) continued. The Release Ordinance lists in its appendix 14 invasive alien taxa (11 plants and 3 animals; http://www.admin.ch/ch/e/rs/814_911/app2.html#ahref1) for which the handling in the environment is prohibited, except for measures for control. In addition to the Release Ordinance, other federal ordinances such as the Ordinance on Hunting and the Protection of Wild Mammals and Birds (SR 922.01) and the Ordinance on the Federal Act on Fish and Fishery (SR 923.01) include regulations for particular non-native species groups, such as birds, mammals, fish and crustacean.

Several (research) projects are running in Switzerland, focusing on various alien species such as *Arion lusitanicus*, *Harmonia axyridis*, *Ponticola kessleri*, *Reynoutria japonica* (with a workshop held in august 2014: <http://www.europeanknotweedcontrolnetwork.eu/events-2/european-knotweed-workshop/>), *Ailanthus altissima*, monitoring of *Aedes albopictus*, and investigating the role of leisure boats as intranational vectors for alien aquatic species between lakes in Switzerland.

The list(s) of invasive alien plants have recently been revised and now include 58 taxa: https://www.infoflora.ch/fr/assets/content/documents/neophytes/Liste%20Noire_Watch%20Liste_2014.pdf.

UKRAINE / UKRAINE

REPORT ON THE ACTIVITIES ON INVASIVE ALIEN SPECIES (IAS) IN UKRAINE FOR THE 11TH MEETING OF THE GROUP OF EXPERTS ON INVASIVE ALIEN SPECIES OF THE BERN CONVENTION (2013–2015)

Introduction

Invasive alien species (IAS) continue to be a significant factor for biological diversity in many countries including Ukraine. Despite difficult socio-economic situation in Ukraine some activities focusing on IAS have been undertaken in Ukraine, mostly in terms of scientific research, public awareness as well as policy documents.

Legal Framework

Detailed information on legal framework with regards to IAS in Ukraine is given in the document [T-PVS/Inf\(2011\)03E, presented on the](#) 9th meeting of the Group of Experts on Invasive Alien Species held in Malta, 2011 with some additions presented in the document T-PVS (2013) 5.

Association Agreement between the European Union and the European Atomic Energy Community and their member states, of the one part, and Ukraine, of the other part had been signed by Ukraine on 27 June 2014. Among other provisions of the Agreement there is an obligation to harmonize national legislation of Ukraine with that of EU *acquis communautaire* including Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. The Directive contains some provisions on IAS which should be addressed in the legislation.

IAS related activities

A Code of Conduct on Invasive Alien Species for Botanical Gardens and Arboretums of Ukraine had been published in 2014 based on relevant documents of the Standing Committee of the Bern Convention.

Ivashchenko A.A., Burda R.I. (2014) had published a brief overview of the European regulatory and recommendatory documents on invasive alien species adopted under the UN Convention on Biological Diversity and the Bern Convention (Directives, Decisions, Codes of Conduct, etc.) and discussed the opportunities for implementation of the European policy on IAS in Ukraine. It is proposed to adopt a national strategy on IAS, compose a national checklist of IAS, as well as regional and field-specific checklists, and to establish recommendatory codes of conduct on IAS for biosphere reserves, nature reserves, national parks, botanical gardens and arboretums.

A number of scientists had published their papers in 2013–2015 on IAS and some of them are presented below.

There has been a study on spread, pathways, vectors and ecological impact of alien invertebrate species and fish in the Dnieper River basin published in 2014 by V. P. Semenchenko, M. O. Son, R. A. Novitsky, Y. V. Kvatch and V. E. Panov. The Dnieper is a largest river in Ukraine. The relationship between invasive processes and basin hydrology is analyzed. It is shown that the main factor in spreading of alien species in the central part of basin was the construction of reservoirs. Authors believe that the main reasons to promote the spreading of alien species were “limnesation” of river and introduction of the Ponto-Caspian species into the reservoirs. In the reservoirs in the middle part of the river the main pathway was intentional introduction whereas that for the upstream were shipping and natural spread. The “black list” of invertebrates and fish is presented. Totally 21 species were listed in the “black list”.

According to B. Aleksandrov, O. Voloshkevich, A. Kurakin, A. Rybalko, V. Gontar (2014) the freshwater bryozoan *Pectinatella magnifica* (Leidy, 1851) was found for the first time in the Ukrainian part of the Danube Delta (Poludionniy arm, 45°25'00" N, 29°45'25" E) in 2005. Since then, it has

increased in abundance. The greatest colony numbers occurred on both dead and living reed stems in the delta region 1.5–2.0 km upstream from the Black Sea.

New data about non-native range of Chinese Sleeper (*Perccottus glenii* Dybowski, 1877) in Ukraine are presented by Y. Kutsokon, P. Pukhtayevych, G. Kolomytsev (2013). This invasive fish was found on the south of Zhytomyr region namely: in the basins of the first order tributary of Dnieper river – Ros, Irpin, Teteriv and Pripyat. The basic morphological features of Chinese Sleeper within this region are described.

IAS in the Danube River had been studied in the framework of the Joint Danube Survey 3 (JDS3) the results of which were published in 2015. Ukraine took part in JDS3 as a Member State to the International Commission for the Protection of the Danube Basin. Twenty five neophytes (4 aquatic), 34 non-native aquatic macroinvertebrates and 12 non-native fish species were recorded during the JDS3 survey.

G.A.Chorna (2014) had investigated the features of reproduction biology of *Elodea canadensis*, *Elodea nuttallii*, *Pistia stratiotes*, *Vallisneria spiralis* in the territory of Forest Steppe Ukraine. Their comparison with literature data on other invasive hydrophytes of world flora, first of all *Eichhornia crassipes*, *Salvinia molesta*, allowed revealing regularities of vegetative reproduction domination, diaspora distribution and high reproductive potential.

B. Vykhor, B. Prots (2014) had conducted an ecological analysis of invasive plant species of the Transcarpathia. The group of the invasive plant species of the Transcarpathia consists of 43 species. The leading family is Asteraceae. The neophytes are dominant group by time of introduction, the ergasiophygophytes - by mode of introduction.

K.A. Zvyagintseva (2013) analyzed the expansion of 14 species of invasive alien plant in the urban flora of Kharkiv (Ukraine). Biomorphic, coenomorph, ecological and geographical analyses are discussed and the distribution maps of these species in the city are provided.

Following the analysis of 13 features of life biology and population ecology of invasive alien plants in Ukraine O. Abdulayeva (2013) had chosen some invasiveness criteria. According to her the invasiveness criteria display an invasion risk level of the given alien plant species in seminatural and natural ecosystems of the second, derivative area.

R. Burda, V. Protopopova, M. Shevera, M. Golivets (2014) had compiled a bibliographic list on alien species of flora in Ukraine.

Ukrainian Ecological Club “Green Wave” under support of Matra Programme of the Royal Netherlands Embassy in Ukraine and Mava Foundation pour la Nature in the framework of the project “Capacity building for biodiversity conservation in Ukraine: establishment of network and raising education level” in 2014–2015 had prepared a teaching module “Scientific Fundamentals for Biodiversity Conservation” based on materials of the Center for Biodiversity and Conservation of the American Museum of Natural History. The module consists of 13 chapters and the Chapter 5 devoted to invasive species and mechanisms of invasions. The module is available online at https://drive.google.com/folderview?id=0B3ZdBtosfG0tVXdnsGR_tYUFFdkU&usp=sharing.

18–20 May 2015 in "Medobory" Natural Reserve (Ternopil'ska oblast, Ukraine) there was a scientific and practical seminar for protected areas staff-members "Conservation and restoration of natural ecosystems in natural reserves and protected areas of nature reserve fund institutions" where one of the main topics discussed was IAS spread and control on protected areas. Relevant resolution was adopted (http://menr.gov.ua/images/blog/news/10_06_2015/RS.docx).

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