ALIEN SPECIES OF EU CONCERN IN ROMANIA

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KEYWORDS: alien species, Romania, distribution, invasiveness, EU list. **ABSTRACT**

Of the 37 species of the European Union concern eight are already present and two present a future potential risk for Romania. This paper brings updated information regarding these species in Romania. The presence of eight invasive alien species of concern to the European Union have already been recorded in Romania: two plant species *Cabomba caroliniana* and *Heracleum sosnowskyi*, two crustaceans *Orconectes limosus* and *Eriocheir sinensis*, two fish species *Pseudorasbora parva* and *Perccottus glenii*, one reptile *Trachemys scripta* and one mammal *Myocastor coypus*. Other two species of Union concern (*Lithobates catesbeianus* and *Procyon lotor*) may soon become invaders in Romania. We emphasize the urgent need to assess their current distribution and impact or potential to establish and possible impact at national level.

RÉSUMÉ: Espèces exotiques préoccupantes pour l'Union Européenne en Roumanie.

Parmis les 37 espèces préoccupantes pour l'Union Européenne, huit sont déjà présentes et deux autres présentent un futur risque potentiel pour la Roumanie. Cet article apporte des informations régulièrement mise à jour sur ces espèces en Roumanie. La présence de huit espèces exotiques envahissantes préoccupantes pour l'Union a été déjà notée pour la Roumanie: deux espèces végétales *Cabomba caroliniana* et *Heracleum sosnowskyi*, deux crustacés *Orconectes limosus* et *Eriocheir sinensis*, deux espèces de poissons *Pseudorasbora parva* et *Perccottus glenii*, un reptile *Trachemys scripta* et un mammifère *Myocastor coypus*. Deux autres espèces préoccupantes pour l'Union (*Lithobates catesbeianus* et *Procyon lotor*) deviendront bientôt des espèces envahissantes en Roumanie. Nous insistons sur le besoin urgent d'évaluer au niveau national leur distribution et leur impact présent ou leur capacité à s'installer et leur impact possible.

REZUMAT: Specii alogene de interes pentru Uniunea Europeană.

Dintre cele 37 specii care preocupă Uniunea Europeană, opt sunt deja prezente și două prezintă un viitor risc potențial pentru România. Prezentul articol aduce informații actualizate cu privire la aceste specii în România. Prezența a opt specii invazive alogene de interes pentru Uniune a fost deja înregistrată în România: două specii de plante *Cabomba caroliniana* și *Heracleum sosnowskyi*, două specii de crustacee *Orconectes limosus* și *Eriocheir sinensis*, două specii de pești *Pseudorasbora parva* și *Perccottus glenii*, o specie de reptile *Trachemys scripta* și o specie de mamifere *Myocastor coypus*. Două alte specii invazive în România. Insistăm asupra nevoii urgente de evaluare a distribuției și impactului acestora în prezent sau a potențialului de a se stabili și a posibilului impact la nivel național.

INTRODUCTION

Any regional flora and fauna goes through continuous changes yet these changes are, most of the time, difficult to perceive during a human lifetime. Some natural phenomena such as volcanic eruptions, glaciations, meteorite impacts, etc., are accelerating the flora and fauna turn-over. After man's expansion on Earth, the changes in the structure of the flora and fauna occurred at an increasing pace, locally, regionally, and globally. The profound changes of the last decades under the influence of the industrialization and respectively of globalization include also a larger and increasingly worrying "fluidity" in the reduction, disappearance and introduction of species in equally more extensive biogeographical areas. Alien species and damage or loss of natural habitats are the main factors responsible for the disappearance of some species in past centuries. (Strahm and Rietbergen, 2001) Biodiversity conservation elements should include alien species assessment, monitoring, and management elements (Curtean-Bănăduc, 2006). Aquatic ecosystems, especially those already disturbed by various human activities, appear to be particularly vulnerable to these invasions (Lodge et al., 1998).

In July 2016, the EU adopted a list of 37 invasive alien species that are subject to the restrictions and measures set out in the EU Regulation 1143/2014. The list comprises 23 animals (six species of Crustacea, one insect, two fishes from Actinopterygii class, one amphibian, one reptile, three birds, nine mammals) and 14 plant species (Tab. 1) (European Comission, 2016).

As such, all member states are required to implement cost-effective measures to eradicate these species.

There are several major problems regarding the impact of alien species on biodiversity conservation and management at national level. Thus Romanian legislation on alien species (Ministerial Order 979/2009) does not include lists of alien species and refers to the DAISIE the National Biodiversity Strategy and Action Plan 2014-2020 list. Also. (https://www.cbd.int/doc/world/ro/ro-nbsap-v3-en.pdf) were not ratified by authorities, and the European Biodiversity Strategy 2020 is not implemented at the national level. To comply with the implementation of the EU Regulation 1143/2014, it is necessary to gather information regarding the presence of species of interest, and evaluate their introduction pathways, distribution, and invasive status. Difficulties are encountered in such initiatives: there is limited data available in the scientific literature, inconsistencies and errors in the available databases (e.g., CABI, DAISIE, NOBANIS), and lack of national databases and/or public information regarding alien species. Of the 37 invasive alien species of EU concern, 29 species were not yet reported in Romania, and also their invasion risk was not evaluated.

There is a scarcity of data regarding alien species where apart from the first recording in the country, detailed and updated distribution maps and surveys are missing. The goal of the present paper is to illustrate an update on the distribution and known impact of the alien species of EU concern present in Romania.

Kingdom	Class	Species
Plantae	Magnoliatae	Baccharis halimifolia L.
Plantae	Magnoliatae	Cabomba caroliniana Gray
Animalia	Mammalia	Callosciurus erythraeus Pallas, 1779
Animalia	Aves	Corvus splendens Viellot, 1817
Plantae	Liliatae	Eichhornia crassipes (Martius) Solms
Animalia	Crustacea	Eriocheir sinensis H. Milne Edwards, 1854
Plantae	Magnoliatae	Heracleum persicum Fischer
Plantae	Magnoliatae	Heracleum sosnowskyi Mandenova
Animalia	Mammalia	Herpestes javanicus É. Geoffroy Saint-Hilaire, 1818
Plantae	Magnoliatae	<i>Hydrocotyle ranunculoides</i> L. f.
Plantae	Liliatae	Lagarosiphon major (Ridley) Moss
Animalia	Amphibia	Lithobates (Rana) catesbeianus Shaw, 1802
Plantae	Magnoliatae	Ludwigia grandiflora (Michx.) Greuter and Burdet
Plantae	Magnoliatae	Ludwigia peploides (Kunth) P. H. Raven
Plantae	Liliatae	Lysichiton americanus Hultén and St. John
Animalia	Mammalia	Muntiacus reevesi Ogilby, 1839
Animalia	Mammalia	Myocastor coypus Molina, 1782
Plantae	Magnoliatae	Myriophyllum aquaticum (Vell.) Verdc.
Animalia	Mammalia	Nasua nasua Linnaeus, 1766
Animalia	Crustacea	Orconectes limosus Rafinesque, 1817
Animalia	Crustacea	Orconectes virilis Hagen, 1870
Animalia	Aves	Oxyura jamaicensis Gmelin, 1789
Animalia	Crustacea	Pacifastacus leniusculus Dana, 1852
Plantae	Magnoliatae	Parthenium hysterophorus L.
Animalia	Actinopterygii	Perccottus glenii Dybowski, 1877
Plantae	Magnoliatae	Persicaria perfoliata (L.) H. Gross (Polygonum perfoliatum L.)
Animalia	Crustacea	Procambarus clarkii Girard, 1852
Animalia	Crustacea	Procambarus fallax (Hagen, 1870) f. virginalis
Animalia	Mammalia	Procyon lotor Linnaeus, 1758
Animalia	Actinopterygii	Pseudorasbora parva Temminck and Schlegel, 1846
Plantae	Magnoliatae	Pueraria montana (Lour.) Merr. (Willd.) Pueraria lobata (Willd.)
Animalia	Mammalia	Sciurus carolinensis Gmelin, 1788
Animalia	Mammalia	Sciurus niger Linnaeus, 1758
Animalia	Mammalia	Tamias sibiricus Laxmann, 1769
Animalia	Aves	Threskiornis aethiopicus Latham, 1790
Animalia	Reptilia	Trachemys scripta Schoepff, 1792
Animalia	Insecta	Vespa velutina nigrithorax de Buysson, 1905

Table 1: List of invasive alien species considered of European Union concern according to Commission Implementing Regulation (EU) 2016/1141.

MATERIAL AND METHODS

Information regarding distribution and potential impact of the target species was collected from many sources. The authors added to their personal field data, information based on reliable personal communications, literature and databases (CABI ISC, DAISIE, ESENIAS, GISD), questionnaires for game species managers, surveys of pet-shops and field surveys, etc. The data about the distribution and introduction pathways were collected from many reference data. The invasive status was considered (high, medium, low) based on expert opinion.

RESULTS AND DISCUSSION

The 37 invasive alien plant and animal species of EU concern are distributed among the following higher taxa: three Liliatae, 11 Magnoliatae, six Crustacea, one Insecta, two Actinopterygii, one Amphibia, one Reptilia, three Aves, and nine Mammalia.

Plants

In regards to alien plant species, 14 are included on the list of EU concern, but only two have so far been found in Romania: *Cabomba caroliniana* and *Heracleum sosnowskyi* (Anastasiu and Negrean, 2009; Sîrbu and Oprea, 2011). Both are considered naturalized. One location has been reported for both species, but the data are very old and need to be updated.

Cabomba caroliniana A. Gray (family Cabombaceae) (Carolina water-shield) originates from America. In Romania it was acclimatized in the Ochiul Țiganilor Wetland and Pârâul Pețea near Băile 1 Mai (Bihor County) in 1950 (Țopa, 1955). This is the single presence point of this plant known in Romania. Țopa (1955) specifies that it is a beautiful plant and can be easily reproduced by cuttings, and is recommended for freshwater aquariums. The plant has been recently reported as naturalized in Romania (Lansdown et al., 2016), without any further information being provided about its distribution. Its invasion risk in Romania is medium.

The species is not included in Flora Europaea, even though the data reported from Romania preceded the publication of the two editions of Flora Europaea. Uotila (2009) indicates it as a foreign species only in Great Britain (Sîrbu and Oprea, 2011). According to the file available at www.cabi.org, *Cabomba carolianiana* is present only in the following European states: Belgium, France, Greece, Hungary, the Netherlands, Serbia, United Kingdom (England, Scotland, and Wales).

The second plant species of interest for this paper is Sosnowskyi's hogweed (*Heracleum sosnowskyi* Manden., Apiaceae).

According to the file available at www.cabi.org, *Heracleum sosnowskyi* is present in the following European states: Belarus, Denmark, Estonia, Finland, Germany, Hungary, Iceland, Latvia, Lithuania, Poland, Russia, Ukraine. Romania is not featured on this list, although the plant was reported as naturalized in 2001 (Maruşca and Pop, 2001) and is included on the list of neophytes in Romania (Anastasiu and Negrean, 2009). According to Maruşca and Pop (2001), the species was brought to Romania from Poland in 1975, during a presidential visit, whereby it was presented as high quality fodder. Initially cultivated at Fundulea (Călăraşi County), in 1980 it was transferred to Prejmer (Braşov County). The plant did not survive at Fundulea, but it did survive at Prejmer, although in the first years it was small and it did not show any tendency to expand. Twenty years after its introduction in Braşov County, *Heracleum sosnowskyi* was found approximately 300 meters away from the place where it was first sown, nearby Halta Ilieni, with over 900 individuals on a surface of around 750 m² (Maruşca and Pop, 2001). The two authors consider that *Heracleum sosnowskyi* is "an invasive and dominant species" which forms a new vegetal association, *Cirsio (oleracei) – Heraclietum*. According to Maruşca and Pop (2001), "the dominant species – *Heracleum*

sosnowskyi, eliminated almost all the other species. Considering its continuing expansion, this species could represent a real danger for zonal biodiversity as well as for a large area biodiversity." Nevertheless, subsequent data regarding the expansion and impact of this species have not been published. The invasion risk of *H. sosnowskzi* in Romania is high.

In regards to *Eichhornia crassipes*, another species of interest for the European Union, the species is not mentioned in older papers, but it is recorded as casual in a more recent paper (Lansdown et al., 2016). It constantly enters the country due to horticulture trade.

Invertebrates

The List of EU concerns contains seven invertebrate species, of which six are aquatic, represented by crustaceans, and one is a terrestrial insect. The presence of two of these invertebrate species, namely *Orconectes limosus* and *Eriocheir sinensis*, have previously been recorded in Romania in natural and semi-natural habitats. However, their status and current distribution need to be updated, and the potential impact of the species should also be assessed.

The spiny-cheek crayfish, *Orconectes limosus*, is native to North America and was intentionally introduced in Europe in the late 19th century possibly to compensate for the decline of the native noble crayfish *Astacus astacus* (L.) populations (Holdich, 2002; Holdich and Black, 2007). The species is currently widespread in Europe, expanding its range naturally as well as through human-mediated dispersion. In Romania, *O. limosus* was first recorded in spring 2008 on the shore of the Danube in an area included in the Iron Gates Natural Park (located in SW Romania) and is quickly spreading downstream at an estimated rate of 13-16 km yr⁻¹ (Pârvulescu et al., 2009). *O. limosus* competes with native species for resources and it may have an impact on the structure of the invaded habitats (Gherardi, 2007). But it is also involved in the transmission of the "crayfish plague" to native species, a disease caused by infection with the oomycete *Aphanomyces astaci* that is considered a major contributor to the decline of European freshwater crayfish (Schrimpf et al., 2012). The invasion risk of *O. limosus* was evaluated as high.

Following the accidental introduction in Germany in 1912 from its native range in eastern Asia, the Chinese mitten crab, Eriocheir sinensis, has spread throughout Europe (Herborg et al., 2003). The presence of E. sinensis was first recorded in Romania in the late 90's (Gomoiu and Skolka, 1998) and subsequently in the Danube Delta (Otel, 2004; Micu and Micu, 2006). The species is probably found along the entire lower sector of the Danube, as it has been observed in several locations in Serbia (Paunovic et al., 2004; Škraba et al., 2013) and Bulgaria (Kutsarov and Trichkova, 2016). However, the Chinese mitten crab is a catadromous species. The adults migrate to brackish or salt waters to reproduce while the juvenile crabs invade estuaries during their migration upstream and they can travel great distances (i.e. hundreds of km). According to Herborg et al. (2003), the average total distance of upstream migration reached 562 km/year during the peak period 1928-1939 for Northern Europe and 104 km/year for Southern France (1954-1960). The Chinese mitten crabs are omnivorous and may negatively affect native communities through e.g. competition, predation, and nutrient cycling. Rudnick and Resh (2005) suggest that E. sinensis feeding habits could influence shifts in the composition of the invertebrate communities towards deeper sedimentdwelling species and that the crabs have an impact on nutrient dynamics as they export biomass out of the freshwater ecosystems when migrating for reproduction. The Chinese mitten crabs can cause riverbank erosion through their burrowing activities. Recently, the Chinese mitten crabs have been identified as vectors of the crayfish plague pathogen Aphanomyces astaci (Schrimpf et al., 2014). The invasion risk of E. sinensis is high.

The other five invertebrate species included in the List of Union concern have not been recorded in Romania yet, but their arrival might be just a matter of time. The red swamp crayfish, Procambarus clarckii, and the signal crayfish, Pacifastacus leniusculus, are known to occur in several European countries while the virile crayfish, Orconectes virilis, and the marbled crayfish, Procambarus fallax, have a more restricted distribution (Kouba et al., 2014; Loureiro et al., 2015). Nevertheless, P. leniusculus has been observed in Hungary since the 2000's (Puky et al., 2005) and further expansion coupled with intentional releases or escapees from the aquarium/aquaculture trade increases the chances that various alien crayfish establish in natural and semi-natural habitats. Their impact on native biota and ecosystems can occur through a wide range of mechanisms, like in the case of the red swamp crayfish (Souty-Grosset et al., 2016).

The Asian yellow-legged hornet, Vespa velutina, is the only insect currently on the list. In 2004, the subspecies nigrithorax was recorded in south-western France (Haxaire et al., 2006) and subsequently spread to other European countries, including Italy (Bertolino et al., 2016). Recent studies suggest that V. velutina could spread over a large part of Europe, and that climate change increases the risk of invasion (Rome et al., 2011; Barbet-Massin et al., 2013). As a predator of other insects, particularly the honey bee, the presence of V. velutina in Europe causes concern related to its potential impact on bee colonies and pollination, beekeeping, and human health (de Haro et al., 2010; Monceau et al., 2013; Arca et al., 2014). We consider monitoring actions and awareness campaigns mandatory for the early detection of these and other alien species in order to prevent their spread and impact at lowest costs.

Amphibians and reptiles

The American Bullfrog (Lithobates catesbeianus) was introduced in several western European countries (France, Italy, Belgium, United Kingdom, Spain) (Stumpel, 1992), but is still scarcely distributed in Eastern Europe: it was only reported from the island of Krete (Ficetola et al., 2007a) and recently from Slovenia (Kirbiš et al., 2016), although the region overall has a high suitability for the species (Ficetola et al., 2007b). There are no distribution records from Romania or its neighbouring countries, although there is a risk of introduction by farming or the pet trade.

The Common Slider, Trachemys scripta, is the most widespread alien species in the region, and reports of successful breeding populations are available from several European countries including: Italy (Crescente et al., 2014), Serbia (Dorđević and Anđelković, 2015), Slovenia (Vamberger et al., 2012), Croatia (Jelić et al., 2016), and southern Turkey (Çiçek and Ayaz, 2015). Juveniles are still traded in pet-shops. The presence of this species in Romania was reported only from ponds and lakes within urban areas or their vicinities. Due to its longevity, it can achieve high population densities (Ficetola et al., 2012). It can compete with the native terrapin (*Emys orbicularis*) for resources, can transmit parasites and pathogens, and is a predator of native freshwater fauna. The invasion risk of T. scripta is evaluated as medium. Fish

Among the vertebrates, the freshwater fish species have the largest share in the accidental and by-purpose introductions of alien species. In most of these cases, a negative direct and indirect impact was registered on the native species. In Europe, there are about 40 introduced fish species, and many more were translocated from some other European countries. In most cases a foreign species of fish will not be limited to the basin of initial entry; most often that species will spread into an increasingly expanded territory (Holčik, 1991).

Among the fish species listed by the EU in this study context, *Pseudorasbora parva* is widespread in Romania in the last decades, and *Perccottus glenii* is in a constant trend of increasing its distribution. The potential impact of both of these species should be assessed.

Pseudorasbora parva Temminck and Schlegel, 1846 (Actinopterygii, Cypriniformes, Cyprinidae, Gobininae) it is a freshwater, benthopelagic, small-sized fish (7-12 cm), most abundantly found in well vegetated small channels and ponds and lakes but also in running water, maximum reported age five years fish species with a relatively large distribution: Amur to Zhujiang drainages in Siberia, Korea and China. Introduced in various areas in Asia and Europe, several countries reported adverse ecological impact after introduction. It feeds on small insects, fish and fish eggs, and usually breeds in habitats with still or very slow-flowing water three-four times in a season. (Bănărescu, 1964; Bănărescu and Nalbant, 1965, 1973; Welcomme, 1988; Bănărescu, 1990; Novikov et al., 2002; Bănăduc and Bănăduc, 2008; Verreycken et al., 2011) The invasion risk of *P. parva* was evaluated as high.

P. parva, was accidentally introduced from Yang-Tze Watershed from China in Romania (Nucet, Dâmbovița and Cefa, Bihor piscicultural stations for aquaculture) in 1960-1962, together with the Chinese cyprinids with economic value (*Ctenopharyngodon idella* Cuvier and Valenciennes, 1848, *Hypophthalmichthys molitrix* Cuvier and Valenciennes, 1848, *Aristichthys nobilis* (Richardson, 1844), *Mylopharyngodon piceus* (Richardson, 1846), *Parabramis pekinensis* (Basilewsky, 1855), *Megalobrama terminalis* (Richardson, 1846)) (Witkowski, 2009)

P. parva is a species with a high dispersion potential, which succeeded in spreading out in almost all the countries of Europe during the 45 years that passed from its admission into this continent. There were several centers in Europe, out of which the *P. parva* then spread out on almost the entire continent. The two major centers were Romania (from where the species naturally spread out in the whole Danube Basin) and Albania (from where the species spread out in the Balkans, still naturally). In the countries of the former Yougoslavia, the species penetrated from both centers; in Hungary, Slovakia and the Czech Republic, the species penetrated naturally, and from Romania, it penetrated artificially, as it was brought straight from China together with some other species of fish of economic interest. In Poland and Northern Bulgaria, the species was seemingly brought from the Ukraine. The origin of the Danube Basin. We assume that the species arrived in Denmark from Germany. We do not know how the species got on England's and Spain's territory, but it was most likely artificially introduced from a European country. (Gavriloaie, 2007)

In Romania and surrounding countries *P. parva* is living already in the Danube River and all the Romanian hydrographic basins: Tisa, Someş, Crişuri, Mureş, Bega, Timiş, Caraş, Miniş, northern Danube Iron Gorge tributaries, Cerna, Jiu, Olt, Vedea, Argeş, Ialomiţa, Mostiştea, Călmăţui, Siret, Prut, and in some of the near Black Sea Dobrogea region water bodies (Giurcă and Angelescu, 1971; Bănăduc, 1999, 2005, 2013; Schiemer et al., 2004; Battes et al., 2005; Oţel, 2007; Hartel et al., 2007; Costiniuc et al., 2006; Moşu et al., 2006; Năvodaru and Năstase, 2006; Vornicu et al., 2006; Ardelean and Wilhelm, 2007; Telcean and Cupşa, 2009; Goia et al., 2014; Ureche and Ureche, 2015; Bănăduc et al., 2016; Takács et al., 2017).

The appreciable dispersal of *P. parva* on the Romanian hydrographical basins, after its accidental introduction, was due to escapes from piscicultural basins and in their adjacent channels and streams and rivers, and its use as living bait.

It thrives in piscicultural and in the natural areas in some lakes and small hill- and plain- rivers, but is also present in large rivers and even lakes. The polluted areas are included in its normal range of distribution (Gavriloaie and Chiş, 2006).

In the background of the intensive trade of Chinese carp species in 1960s, the invasive characteristics of this accidental introduced fish species with a high plasticity and adaptability to lentic and lotic conditions were proved extensively through natural dispersal in the Romanian hydrographical net. The potential management actions are severely limited to early detection and rapid intervention.

A climatic and human impact associated model combined with an introduction pathways analysis could enable accurate prediction on the risk of spread of this species areal in the higher altitude Romanian water bodies, allowing for robust monitoring and fast intervention management actions.

Perccottus glenii Dybowski, 1877 (Actinopterygii, Perciformes, Odontobutidae) is a freshwater, brackish, demersal, fish species that occurs in lentic waters, lakes, ponds, backwaters and marshes with dense underwater vegetation. It avoids lotic sectors with currents, can tolerate poorly oxygenated water, and is able to survive in dried out or completely frozen water bodies by digging itself into mud where it hibernates. Maximum reported age is seven years for this fish species, and it has a large distribution. The Sea of Okhotsk and Amur southward to Yangtze and Fujian is included in its distribution. It was introduced in Europe, and at least one country reports adverse ecological impact after introduction. It is a voracious predatory fish, feeds on invertebrates, tadpoles and fish, posing a most serious threat to aquatic fauna wherever it occurs, in small water bodies known to extirpate almost all other fish species and amphibian larvae. Reproduction starts for the first time at one-three years, with males guarding the eggs and pelagic larvae (Berg, 1965; Novikov et al., 2002; Koščo et al., 2008; Kati et al., 2015). The invasion risk of *P. parva* was evaluated as moderate to high.

P. glenii was introduced in Russia, near Sankt Petersburg at the beginning of the 20th century, and only later, during the past two decades, it started spreading to the west of Europe. Because of its high resistance to extreme environmental conditions and due to the economic loss caused in the fishing ponds, this species became a real threat for the freshwater ecosystems in Asia and Europe. (Luca and Ghiorghiță, 2014)

Perccottus glenii appeared recently and spread in different parts of the Romanian and neighboring countries' watersheds like: Danube Delta, Danube River, Mureş River basin, Siret Basin, Suceava Basin, Crişuri rivers basin and Timiş River basin (Nalbant et al., 2004; Jurajda et al., 2006; Simonović et al., 2006; Popa et al., 2006; Moşu, 2007; Năstase, 2007; Copilaş-Ciocianu and Pârvulescu, 2011; Covaciu-Marcov et al., 2011; Kvach, 2012; Luca et al., 2014; Bănăduc et al., 2016; Telcean and Cicort-Lucaciu, 2016; Takács et al., 2017).

Birds

None of the alien bird species of Union concern have been reported in Romania, but their presence should be carefully monitored due to the rapid expansion of their range.

Mammals

Nine mammalian alien species are of Union concern, of which only *Myocastor coypus* is present in Romania. *Procyon lotor* might soon become an invader as it is already present in neighbouring countries.

Myocastor coypus, is a large, robust and heavy rat-like rodent, with an average body weight of five-six kg, with males bigger than females reaching up to 10 kg (Bertolino et al., 2012). Coypus are mostly nocturnal, inhabiting aquatic habitats where they feed on vegetation

(Wood et al., 1992). Originating from southern South America, it was introduced in Europe for the fur trade, starting in the 1880's in France (Carter and Leonard, 2002). It is now established in Europe. It was first reported in Romania in 1959 (Murariu and Chişamera, 2004). It has an impact on bank stability due to its burrows; it can impact aquatic vegetation through overgrazing and can prey on the water birds nests (Woods et al., 1992; Angelici et al., 2012). The *M. coypus* presents a high invasion risk for Romania.

A climatic and human impact associated model combined with an introduction pathways analysis could enable accurate prediction on the risk of more extention of this fish species areal in the unaffected by now of Romanian water bodies, allowing for robust monitoring and fast intervention management actions.

CONCLUSIONS

Are the identified data up to date? Is their updating necessary before setting the management measures for these particular species? What are the entry paths? What is the invasiveness status in our country?

The data available so far are not sufficient for developing an adequate management plan for the control, containment, and eradication of these species. A national program to monitor the distribution and impact of these species is required, together with the development of a rapid response and information network of the countries in the region. The pet and horticultural trades require strict regulations regarding the import of species posing high risk of invasiveness, since the most unregulated activities are the pet trade and the horticulture trade.

The studied alien species of interest for the European Union present in Romania were partially reported, the most of them with medium to high invasion risk, yet their present distribution is not known.

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