

Секция 6. Проблемы сохранения биоразнообразия, развития систем ООПТ

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INVASIVE SPECIES

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В статье приведены проблемы, которые возникают в результате интродукции биологических видов, не свойственных данным территориям.

Introduction

Invasive species are animals, fungi or plants introduced into a certain area of which they are not native and which normally grow damaging the environment, the economy and the human health. The introduction may be artificial, accidental or intentional and, after a certain period, these species adapt to the environment and colonize it.

Native species have not evolved in contact with invasive ones and for this reason cannot compete with these species. Thus, they are displaced or, in the worst cases, they die.

The action of invasive species is a serious risk: according to the ONU, the invasion by these species represents the second cause of the loss of biodiversity worldwide.

A little of history

In 1810 Willdenow (a German botanist) recognized human beings as one of the best agents for the dispersion of species: man is the most efficient agent in space and time because he can overcome geographical barriers (seas, mountains ...) and, although species can spread in new areas autonomously, human-mediated diffusion is certainly faster. With the overcoming of geographical barriers through the progressive intensification and extension of communication, man has led many organisms to expand their natural ranges (primary distribution area) and to create new discontinuous distribution areas (secondary distribution area).

The ecology of invasions is the branch of ecology that studies the processes of anthropogenic introduction of species outside their native areas, studying ways of introduction, the ability to spread and settle permanently, the interaction with native species, the assessment of the ecological and economic-health impact (possible allergies, containment costs, eradication and damage to crops). The father of this discipline is Charles Elton (an English zoologist) who in 1958 published a book about the ecology of invasions, speaking both of plants and animals. He highlighted the risks of biological invasions, mainly from the point of view of biological diversity: for example, the 6 floristic kingdoms, if the invasions are carried to an extreme condition, are homogenized to a single kingdom with considerable floristic impoverishment.

Some invasive species

The GISP (Global Invasive Species Program) is a very active group founded in 1996 that proposes practical solutions against invasions. There are cards of invasive species that represent a danger to biodiversity and it has developed a database constantly updated by a group of specialists. In Europe several research projects have been funded and the best is the DAISIE (Delivering Alien Invasive Species Inventories for Europe), a group which established an up-to-date inventory of non-native species introduced in Europe.

In Europe we can find different invasive species:

Diabrotica virgifera virgifera (figure 1): it is an insect with American origin and it can cause serious damage to maize. In Europe it was discovered in Serbia in 1992 at the Belgrade airport and in the European Community was reported for the first time in 1998 near Venice Marco Polo airport in a corn field. It was later found in Lombardy (a region in northern Italy), near the airport of Malpensa and in Piemonte (another region in the northern Italy), in the province of Novara. Now it is very widespread especially in northern Italy, in the main areas of maize. It is also present in many European states such as Serbia, Croatia, Hungary, Romania, Bulgaria, Bosnia and Switzerland.

Ondatra zibethicus (figure 2): it is a medium-sized semi-aquatic animal coming from North America. There were farms in Europe, Asia and South America: with the crisis of the tanning industry, many individuals were left free. Moreover, a lot of individuals escaped successively to incursions of animalistic organizations.

Reproductive communities that do not have predators propagate rapidly: the muskrat currently lives mainly in Central Europe, pushing east through Siberia to Manchuria. However, it is completely eradicated from England, where it was introduced in the 1930s and from Japan where it was introduced in 1945.



Figure 1 – *Diabrotica virgifera virgifera*



Figure 2 – *Ondatra zibethicus*

Myocastor coypus (figure 3): commonly known as the “native otter of South America”, *Myocastor coypus* is the only species of the genus *Myocastor* and the family *Myocastoridae*.

The original range of the species is from Brazil, Bolivia and Paraguay to Argentina and Chile. After the commercial exploitation of its skin, the otter has naturalized in several countries of North America, Asia, Africa and Europe. In

addition, many individuals were intentionally released to prevent death and disposal of corpses after the farm crisis.

The otter population is well adapted to humid environments and in Europe it can be found also in the most contaminated. In 2000 it was reported that 250 million otters populate Europe. The otter can cause economic damages to the agricultural crops, in particular maize and beet.

Bufo marinus (figure 4): normally it has a size from 10 to 15 cm but it may also be larger (the largest individual described weighed 2.65 kg and measured 38 cm). The parathyroid glands of this toad species secrete a toxin (bufotossina) that can have lethal effects on many other species of animals. It is native of the New World, extending in an area that goes from the south of Texas to the Amazon and the south-east of Peru.

It was introduced with intentional biological control in several countries of the world but the results were not always brilliant. In particular, we can recall its introduction in Australia, where it was intended to be used in the fight against some species of insect pests.

The introduction has had a very negative impact on the country's biodiversity. Its rapid reproduction has led to a dramatic reduction in the number of different species of rodents, frogs and reptiles, with which it competes for food. So it has had repercussions on the whole food chain, in addition to reducing the number of predators because of the bufotossina that is lethal for many of them.



Figure 3 – *Myocastor coypus*



Figure 4 – *Bufo marinus*

Silurus glanis (figure 5): the catfish is native of Europe and it is also present in Western Asia. It was introduced in Italy, the Netherlands, Belgium, France, Spain and Great Britain. Its diet is very differentiated including both plants, animals and organic debris. Young individuals usually eat invertebrates and aquatic macrophyte algae.



Figure 5 – *Silurus glanis*

In adults, the plant component of the diet disappears, preferring fish of all types and sizes, amphibians, aquatic birds, rodents, mammals, decapod crustaceans, annelids and insect larvae. In large rivers, such as the Danube, there are also documented attacks on dogs and otters. The species is very prolific since the female usually produces several thousand eggs per pound of weight.

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ОЦЕНКА ПОЖАРНОЙ ОБСТАНОВКИ НА ТЕРРИТОРИИ ЛЕСНОГО МАССИВА

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Large forest fires, being natural disaster, frequent and very dangerous to the population, demand an assessment and surgery of the significant previously trained forces.

Ежегодно на территории Республики Беларусь складывается сложная ситуация, связанная с лесными пожарами, 98% из которых возникает по вине человека. Одной из основных причин возгораний в экосистемах является массовое выжигание сухостоя. Как следствие таких пожаров – огромный экологический и материальный ущерб [1].

При крупном лесном пожаре его скорость, протяженность кромки, площадь, время распространения, а так же количество и тяжесть пораженных (при наличии) очень вариабельны и не всегда предсказуемы.

Успех в локализации и ликвидации крупных лесных пожаров в большой степени зависит от прогнозирования пожарной обстановки, видов, скорости и площади лесных пожаров, а так же от организации работ по локализации и ликвидации в первые часы после возникновения пожара.

Организационной задачей является:

определение участка, мест и порядка локализации и ликвидации лесного пожара;

определение необходимого количества личного состава и техники, расстановка их по местам локализации и ликвидации лесного пожара;

организация учета личного состава и техники по мере их прибытия и сменяемости в течение работ;

обеспечение правоохранительными органами пропускного режима в зону пожара;

организация взаимодействия и всестороннего обеспечения сил и средств, принимающих участие в тушении.

Для расчета необходимых сил и средств для тушения лесных пожаров на сопредельных территориях нами предлагается математическая модель [2], которая состоит из 3 расчетных модулей: