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The biological invasion in Albania

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Abstract

Albania, whose territory comprises many types of habitats and is characterized by a rich biological diversity, is particularly vulnerable to the threats posed by alien invasive species. The spread of invasive alien species is creating complex and far-reaching challenges that threaten both the natural biological riches of the earth and the well-being of our people. While the problem is global, the nature and severity of the impacts on society, economic life, health, and natural heritage are distributed unevenly across nations and regions. Some aspects of the global invasive alien species (IAS) problem require solutions tailored to the specific values, needs, and priorities of nations while others call for consolidated action by the larger world community. Preventing the international movement of invasive alien species and coordinating a timely and effective response to invasions requires cooperation and collaboration among governments, economic sectors, non-governmental organizations, and international treaty organizations. Many features have been attributed to invasive species and invaded ecosystems, but none are universal and invasive species tend to have a suite of traits rather than all of themThe large numbers of alien organisms introduced into Albania do not generally endanger the biodiversity on a large scale.

Key-words: alien species, invasive alien species (IAS), introduction, intentional introduction, establishment.

Introduction

Diffusion of Alien Invasive Plants in land area of Albania and Mediterranean basin belong to ancient period and some of them belong to antiquity. In many cases their influence in autochthon ecosystem and biodiversity of region it can be understood with difficulty. While history of biotic invasion in Albania belong to antiquity today this phenomena is growing up very fast in unexpected manner, as result of globalization. Today in Albania, Invasive Albanian Species represent one of the major objectives for the conversation. European Community consider growth of invasive species number as an important think and emphasize because their diffusion is one of the main causes for the environmental degradation, public health damage and in economy. Many conventions have given priority to the biodiversity decrease due to invasive species and for this reason is realize a global program. Protocol of Cartagen about bio-security, held in 2000, has purpose protection of biologic diversity from the risk caused by the alive organisms modify through the modern biotechnology. Common invasive species traits include fast growth, rapid reproduction, high dispersal ability, phenotypic plasticity (the ability to alter one's growth form to suit current conditions), tolerance of a wide range of environmental conditions, ability to live off of a wide range of food types, single parent reproduction (especially in plants), and, commonly, association with humans **[2,6]** The single best predictor of invasiveness, however, is whether or not the species has been invasive somewhere else **[2].** Anthropogenic dispersal of native species to inadequate sites induces just as many ecological problems. Alien species, however, create important small-scale ecosystem changes at some locations.

Material and methods

This study has been realized in 2006-2008 period in different stages: Preparatory stage, Collection of Plant during the field trip and their determination, Elaboration and data analyses.

Preparatory stage

Collected material in field trip have been elaborated in laboratory, using stereomicroscope, excursionist flora, naphthalene for the herbarium of material collected, presence of rarely and risked species based on red book.

Collection of Plant during the field trip and their determination

In field trips are realized about 106 surveys. They consist in realizing in floristic inventory accompanied by quantitative and qualitative coefficient (quantity-cover, A-D), sociability, topography, soil, climate etc.

Main stage, correlated to the survey process, regards the size determination (Method of minimum area) and selection (method of Mashrut) of survey. Plants are collected equipped with root system, tuber

root, leaf, flower etc. Collected plants are conserved in small plastic packet, accompanied by a small card where are written: type of habitats, locality and place of collection.

Species determination was made based on: **[1, 3, 4]** . Evaluation of invasion scale was made based on **[5].** According to invasion scale, Alien Invasive Species are classified in three categories:

1. Species with full invasion behavior, although this category of species was found in a system by an anthropogenic indication or other indication **[7, 9]** . In this case, advise for further monitoring. 2. Is known as endangering for natural or artificial ecosystem, supposed to be very fast in future. 3. Dangerous species (caused plant modification) in natural ecosystem.

Results and discusion

During the field trip are collected exemplars listed below:

Robinia pseudacacia

Native range: Southeastern United States; on the lower slopes of the Appalachian Mountains, with separate outliers north along the slopes and forest edges of southern Illinois, Indiana, and Missouri.

Common name: Black locust.

With the exception of some alpine regions the *Robinia pseudacacia* (Figure 1) is found naturalized in all regions of Albania. Black locust has been planted extensively for its nitrogen fixing abilities, as a source of nectar for honeybees, and for fencepost and hardwood lumber. It is commonly found in disturbed areas such as old fields, degraded woods, and roadsides. Due to its rapid growth, black locust has been promoted by foresters, and is sometimes planted in or near prairies and native woodland edges **[10]**. The cloned pattern of growth and connected roots are promoted for erosion control.

Figure 1: Robinia pseudoacacia

Black locust is an early succession plant, preferring full sun, well drained soils and little competition. The large, fragrant blossoms of black locust compete with native plants for pollinating bees.

Mowing and burning are only effective in reducing the further spread of young shoots from a clone or parent tree. To kill a clone, cutting alone is ineffective.

Agave americana

Native range: tropical America.

Common names: Century Plant, Maguey (in Mexico), or American Aloe. The name "Century Plant" refers to the long time the plant takes to flower, although the number of years before flowering occurs depends on the vigor of the individual, the richness of the soil and the climate; during these years the plant is storing in its fleshy leaves the nourishment required for the effort of flowering.

Agave americana, (Figure 2) century plant, was introduced into Europe about the middle of the 16th century and is now widely cultivated for its handsome appearance; They grow slowly and flower but once after a number of years, when a tall stem or "mast" grows from the centre of the leaf rosette and bears a large number of shortly tubular flowers. After development of fruit the plant dies down, but suckers are frequently produced from the base of the stem which becomes new plants.

Several populations of *Agave americana* exist in Albania. The exact distribution of the species, the size of its populations and their impacts upon the local ecosystems are largely unknown. This specie was introduced in the area of Çuka Hill's, Porto Palermo

Figure 2: Agave americana in Çuka and Porto Palermo Hills (Saranda District)

(Saranda District), and Zverneci Beach area 3-4 decades ago. The introduction was “successful” and up to now the population reached a large surface. According studies done in last few years, negative impact of this non-native taxon on plant communities in these areas is significant. After some serious discussions between botanists and zoologists the final decision to eradicate population of the subspecies was made. The *Agave americana* is suspected of displacing the Macchie and sandy dune Vegetation.

Acacia saligna

Native range: Western Australia, naturalized elsewhere

Common names: Golden Wreath Wattle, Orange Wattle;

Orange wattle is a large shrub or small tree to 10 m, sometimes developing a spreading crown. Flowers are large golden balls in spring. It grows rapidly and is used for reclaiming eroded hillsides and wastelands and for stabilizing drift sands as well as for fuel. It is useful for windbreaks, amenity plantings, beautification projects, and roadside stabilization in semiarid regions. In Albania in some cases, the parts of sandy dune systems in area between Vlora and Divjaka have been forested (especially the belt between sandy dunes vegetation and Mediterranean Pine forests) with the use of non- native trees *Acacia saligna* (Figure 3) (a wrong practice of the forestation)**.** The forestation process of the dune systems started before 3 - 4 decades.

The Ministry of Environment and Waters Administration must take some forest measures involving all public and private stakeholders in order to incorporate the new philosophy of prevention and control of invasive alien species, stopping these wrong practices etc. and promotion of autochthonous seeds and plants for the protection of native genetic diversity.

Figure 3: Acacia saligna, Southern part of Divjaka Beach

Acacia dealbata

Native range: Western Australia, naturalized elsewhere

Common name: Silver wattle

A Silver wattle is *a* leguminous deciduous tree native to the Western Australia. Even important for ornamental value (Cultivated in Gardens) and an economic relevance, introduced deliberately or uncontrolled introduction of this specie represent a high negative impact on native flora and vegetation (Figure 4). Competes with and replaces indigenous vegetation; increases water loss to the atmosphere; destabilizes stream banks resulting in soil erosion during floods or heavy rains.

The seeds can germinate even after 50 years. Up to 20 000 seeds per square meter have been recorded under a single parent tree. Burning causes rapid germination and the resultant is a "carpet" of seedlings, if left, will form an impenetrable thicket. Silver wattle coppices vigorously and produces root suckers, so a careful combination of chemical, mechanical and management techniques is usually needed for effective control.A example of introduced deliberately of this specie is observed in eastern part of Tirana city, Macchia area (Linxë, Tirana District). Several years or decades after their first occurrence in this area the population reached a large surface, replacing totally the Macchia Vegetation. Currently, the physiognomy of this area is given from the abundance of Acacia dealbata. Impact of this non-native taxon on plant communities in this area is significant. On the other hand, the species serves multiple purposes and has significant economic and cultural values.

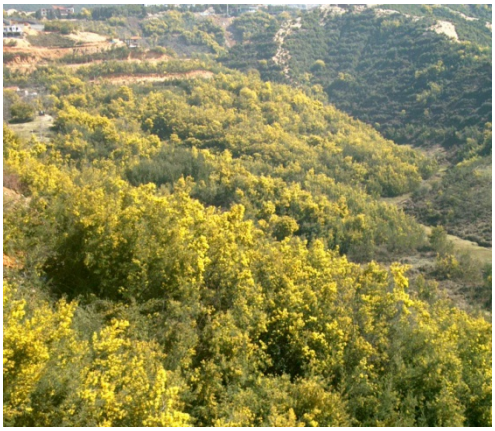

Figure 4: *Acacia dealbata,* Macchia area (Linxë, Tirana District).

Populus x canadensis (Figure 5), (Populus deltoides Marsh. x Populus nigra L.)

Native range: North America.

Common name: Carolina poplar, Italian poplar, poplar

Poplar is a fast-growing and wind resistant tree, growing to 40m. The flowers are dioeciously (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required) and are pollinated by Wind. The plant prefers light (sandy), medium (loamy) and heavy (clay) soils and requires well-drained soil. The plant prefers acid, neutral and basic (alkaline) soils. It cannot grow in the shade. It requires moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution. A fast-growing and wind resistant tree, it can be used in a shelterbelt planting. The tree is late coming into leaf and so often escapes the spring storms. Wood - soft, rather woolly in texture, without smell or taste, of low flammability, not durable, very resistant to abrasion

Poplars have very extensive and aggressive root systems that can invade and damage drainage systems. Especially when grown on clay soils, they should not be planted within 12 meters of buildings since the root system can damage the building's foundations by drying out the soil. A poplar is tolerant of urban pollution.

This hybrid species contains a number of named forms, several of which have been selected for their ornamental value.

With the exception of some alpine regions this hybrid species is found in all regions, now is considered to be naturalized in Albania.

Figure 6: Populus x canadensis

Ailanthus altissima

Native range: Central China.

Common name: Tree-of-heaven, ailanthus, Chinese sumac, and stinking sumac

Ailanthus altissima (Figure 6) is a rapidly growing, deciduous tree, family Simaroubaceae. Mature trees can reach 80 feet or more in eight. *Ailanthus altissima* occurs most frequently in lowland roadsides, in Western part of Albania. Tree-of-heaven is a prolific seed producer, and can overrun native vegetation. Once established, it can quickly take over a site and form an impenetrable thicket. An *Ailanthus* tree also produces toxins that prevent the establishment of other plant species. The root system is aggressive enough to cause damage to sewers and foundations. Invasion by *Ailanthus altissima* in Albania is result of wrong planting practices of foresting in the past.

Figure 5: Ailanthus altissima, by the side of road Elbasan- Cërrik

Carpobrotus edulis

Native range: South Africa

Common name: Ice Plant.

Carpobrotus edulis (Figure 7) is a creeping, mat-forming succulent species, and member of the Stone Plant family Aizoaceae, one of about 30 species in the genus *Carpobrotus*. In the early Carpobrotus *edulis* was brought to Europe from South Africa to stabilize soil along railroad tracks. It easily spreads by seed (hundreds per fruit) and from segmentation (any shoot segment can produce roots). Its succulent foliage resistance to some harsh coastal climatic conditions (salt) have also made it a favoured plant in coastal region of Albania, but allways in small populations (on rocky coastal places near Uji i Ftohtë, Vlora District and sandy dunes, Divjaka Beach). The Ice Plant was for several decades widely promoted as an ornamental plant. Actually, does not constitute a major threat. Its main impacts are

smothering, reduced regeneration of native flora, and changes to soil pH and nutrient regimes.

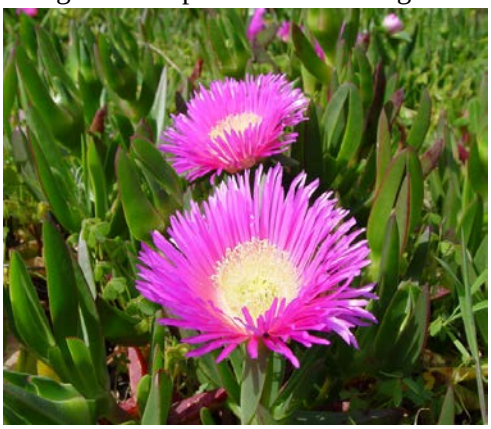

Figure 7: Carpobrotus edulis in Sandy dunes, Divjaka Beach

Figure 10: Oenothera biennis on sandy dunes, Divjaka Beach

Oenothera biennis (Figure 8) also pose a threat to local flora of sandy dune systems. This specie was introduced in the coastal area 2 - 3 decades ago. The introduction was "successful" and up to now the population reached a large surface especially to Southern Divjaka Beach. Here, is a classical example when the disturbance or anthropogenic impact can greatly increase their occurrence.

Sandy dune systems or generally coastal region represents one of the ecosystems that are most vulnerable to introduction. The belt of embrional dunes is more attacked from the alien and invasive species than another habitat. The other invasive species such as *Dittrichia viscosa, Sporobolus pungens, Carpobrotus edulis* and *Aster squamatus are often observed in this belt*. The high dunes are also affected by alien species as result of wrong planting practices and tourism developed in this area (*Acacia cyanophylla, Populus canadensis, Robinia pseudoacacia, Agave americana, Eucalyptus globulus, Eucalyptus camaldulensis, Robinia pseudacacia* etc.). The reason, Sandy dune systems and Coastal region are covered by opened vegetation systems and invasive alien species "easy" can occupy these territories.

Actually, these introduced species represent competitors to sandy dunes vegetation dominated by

Figure 9: Aster squamatus Divjaka Beach

Ammophila arenaria and *Elymus farctus*, but also potential carriers of non-native parasites.

Aster squamatus. In 1979, one small population of *Aster squamatus* (Figure 9) was detected at the Durresi Beach site, introduced through movements at the Durresi Port. Actually, this invasive alien specie is found naturalized in all the lowland regions, most frequently in the Western part of Albania (in roadsides, wetlands, dunes and sandy places, crop fields, rocky habitats etc). The presence of *Aster squamatus* in some cases play an evident role in the general physiognomy of the plant associations related to these habitats. *Aster squamatus* can consider as a potential threat for the near future.

Galinsoga parviflora (Figure 10) another invasive

Figure 8: Galinsoga parviflora Korça District

alien species is found in 1990 in roadsides near the Borshi Village (Saranda District), one small population. Actually, this invasive alien specie is found naturalized

in all regions of Albania. Currently, *Galinsoga parviflora* is not considered a threat for Biodiversity in Albania.

Dittrichia viscosa (Figure 11) is now very common and widespread elsewhere in lowlands mostly in abandoned, mismanaged agricultural and rural areas, but even in roadsides and railroads, dunes and sandy places, wetlands, rocky habitats etc. This specie we think has to consider as a serious plant invaders in Albania.

Figure 12: Dittrichia viscosa, wetlands of Kune – Vaini, Lezha District

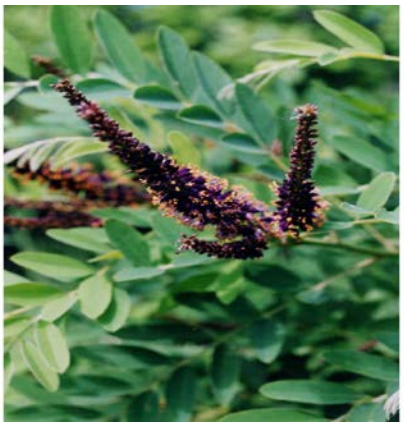

Figure 11: Amorpha fruticosa on riverine habitats of Shkumbini River

Amorpha fruticosa

Native range: Asia.

Common name: ragweed

Ragweed is common specie on riverside habitats, (Figure 12) alluvium forests in Albanian lowlands, but doesn't play any evident role in the general physiognomy of the plant associations related to these habitats.

Conclusions

To achieve this goal we have to build up a effective and visionary management plane that can be implemented at several scales, from a homeowner working in his or her own backyard to large government agencies taking a nation-wide approach. The decision to eradicate a species versus contain it can depend on several factors, including, but not limited to, the type of habitat, characteristics of the organism, the spatial dimensions of the spread, time available to dedicate to control, and cost. Many of these factors may also play into the decision of which specific control technique(s) to utilize.

Recomendations

- There is a general consensus that the international introduction of species should be avoided unless detailed assessments show that the benefits of an introduction are much greater than the associated risks.
- The subset of alien species that are invasive can have significant environmental, economic, public and health impacts and present a significant risk of the wholesale homogenization of ecosystems. Invasive alien species can have a major impact on Albania's environment, threatening individual species and reducing overall species abundance and diversity. Prevention of IAS introductions is generally far more cost-effective and environmentally desirable than measures taken after IAS introduction and establishment;
- If an IAS has been introduced, early detection and rapid action are crucial to prevent its.
- Establishment the preferred response is often to eradicate the organisms as soon as possible.
- Where eradication is not feasible or resources are not available, containment and long-term control measures should be implemented. However, it is important to go further than this basically defensive approach. Conservation policies need to include restoration measures for species, natural habitats and ecosystems that have been affected by biological invasions.
- The government has to minimize the entry of invasive species into the country thorough inspections of international shipments, customs checks, and proper quarantine regulations.
- To better control the entry of invasive insects' measurements as light and ground traps and early deductions has to be applied.
- The general public can also participate in invasive species prevention by educating themselves about this problem and by making informed decisions on related issues.

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