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12

Rare and Endemic Species in Conacu-Negrești Valley, Dobrogea, Romania

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1. Introduction

Since antiquity, man has been concerned with biological diversity. Initially, concerns were related to knowledge of living things in order to use them as sources of food, clothing, to treat various diseases or simply knowledge of the environment. With the accumulation of knowledge, man was concerned about the classification of life forms – first, in the form of empirical systems and later, as scientific systems (Bavaru et al. 2007; Bleahu, 2004).

However, officially, the notion of biodiversity emerged only in 1986. Launched as a purely scientific term in National Forum on Biological Diversity, held in Washington that year and organized by the National Research Council (NRC), the term was formalized in 1988 by entomologist E. O. Wilson in the book "*Biodiversity*", a paper published in the proceedings of the Forum (Bavaru et al. 2007).

Although the term is now widely used in biology, ecology and biogeography, with the signing and entry into force of the Convention on Biological Diversity in Rio de Janeiro in 1992, the term has become a widely used concept, and more or less understood by specialists in other fields (economics, ethnography, law, political science), as well as politicians and public (Skolka et al., 2005; Bavaru et al. 2007).

Until recently, the term was understood only in the sense of specific diversity (all species, subspecies, races, etc. existing in the world). But today, the concept includes other components, such as: genetic diversity, eco-diversity, anthropogenic diversity.

Genetic diversity includes all genetic resources, expressed or not, included in the genetic heritage of life forms on Earth.

Eco-diversity (eco-system diversity, diversity of habitats and ecological systems of life support) is diversity viewed as a whole with the living environment. It includes ecological systems, all species senior biological systems and hydro-geomorphological sistems. It is an important consideration because the species can not protected individually but only in a whole with their environment (Bavaru et al. 2007; Bleahu, 2004; Skolka et al., 2005).

The role and place of man in nature, human evolution, and interconnections between human society and nature, are issues that have gained increasing recognition and stimulated interest in. Human diversity, including linguistic diversity, ethno-cultural diversity, socio-economic diversity (Bleahu, 2004; Botnariuc, 1989; Skolka et al., 2005).

Biodiversity issues in all its aspects must be addressed in terms of protection, rather than conservation, which implies a transition from static to a dynamic management, in which man does not simply collect and store museum artifacts, but is actively and consciously involved in stewardship of all life forms (Bavaru et al. 2007).

During the evolution of life, from its appearance on Earth more than 3.5 billion years ago, specific diversity has changed continuously, and microbial, plant and animal species in now number (5-50 million). Over geological time there have been numerous changes in earth`s crust, cosmic events, alternating periods of warm with many glacial periods. At least five mass extinction events have differentially selected for or against taxa (Skolka et al., 2005). Humans have played and continue to play a major role in extinction, and have initiaded a sixth major extinction event. This is particulary alarming as the many species disappear before they are even scientifically recognized, and natural ecosystems are deteriorating rapidly.

Experts estimate that about 50.000 species worldwide are lost to extinction each year, many of which have not even described (Bavaru et al. 2007; Bleahu, 2004; Botnariuc, 1989; Skolka et al., 2005).

Ecosystems and habitats sustain multiple damages, including desertification, overexploitation of natural resources, the introduction of alien species, expansion of agro-ecosystems and intensive agricultural practices that are detrimental to the environment, the appearance and expansion of urban anthropogenic ecosystems, pollution and other impact. All these are examples of cases with serious consequences locally, regionally and globally (Bavaru et al. 2007; Bleahu, 2004; Botnariuc, 1989; Skolka et al., 2005).

Here I describe the geography, geology, and biogeography of the Dobrogea Region and specifically the Conacu-Negreşti Valley in eastern Romania. I describe the biota that occupy the valley, and describe in detail the ecology and biogeography of a dozen of its little-known rare or endemic plant species. This is a poorly known valley that harbors numerous rare and unique species, and deserves more recognition for its wealth of life and unique natural heritage.

2. Dobrogea region

Dobrogea is located on the northern Balkan Peninsula in southeastern Central Europe – ($44^{0}17`03,77``$N, $28^{0}21`53,27``$E, Figures 1, 2). It occupies an area of approximately 23.142 km^2, of which 15.570 km^2 are located in Romania (making up 6.52% of the total area of Romania; Skolka et al., 2005; Dobrogea, 2011) and 7.572 km^2 in Bulgaria (Dobrici Region, 2011; Silistra Region, 2011). The Dobrogea Region is bordered by the lower Danube River to the southwest, west, northwest and north, the Danube Delta to the northeast, the Black Sea to the east and the Ludogorie Plateau to the southeast and south (Peahă, 1982). The most easterly point of Dobrogea lies at $29^{0}41`24``$ east longitude, corresponding area of the Sulina, Romania.

North Dobrogea is located in the south –eastern of Romania and is composed of two subunits, each with distinctive physical-geographical, soil and climate features: continental Dobrogea (Dobrogea Plateau) and maritime Dobrogea (Peahă, 1982; Skolka et al., 2005).



Fig. 1. Map of Europe (from Google Earth) – showing the position of Dobrogea and Conacu-Negrești Valley in Europe

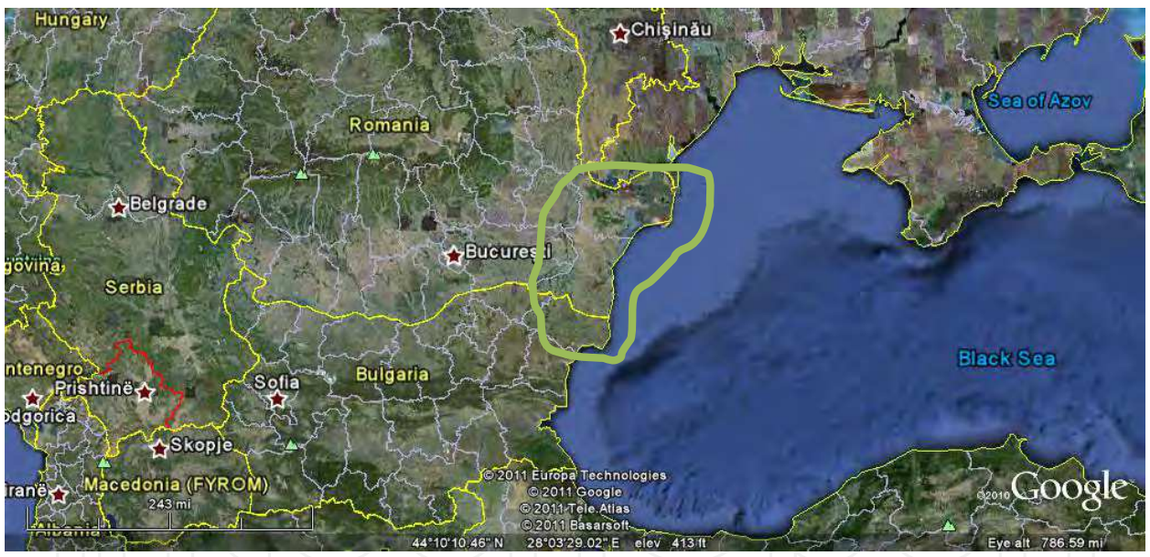


Fig. 2. Geographical position of the Conacu-Negrești Valley in the Dobrogea region (area circled in yellow) (image from Google Earth)

The Dobrogea Plateau is divided into three geographical units: Northern Dobrogea with an average altitudes of 200 m, Central Dobrogea, and Southern Dobrogea, the latter two units with average altitudes of 100 m.

North Dobrogea encompassed several distict geographic subunits: the Măcin Mountains, the Niculițel Plateau, the Tulcea Hills and the Babadag Plateau. The Măcin Mountains are the oldest mountain range in Europe, formed during the late Paleozoic Hercynian orogeny, with a maximum altitude is 476 m on Țuțuiatu Peak or Greci Peak (Axini M., 2009).

Central Dobrogea contains the Casimcea Plateau, the oldest topographic relief in Dobrogea, formed during the early Paleozoic Caledonian orogeny.

South Dobrogea includes the Oltina and Negru-Vodă Plateaus.

The maritime portion of Dobrogea contains the Danube Delta (a fluvial-marine plain undergoing continuous genesis), the Razelm-Sinoie Lagoon complex, and the supra-littoral zone of the Black Sea (Peahă, 1982; Skolka et al., 2005).

3. Conacu-Negreşti Valley

Conacu-Negreşti Valley is located in the center of Cobadin Plateau, subunit of Negru -Vodă Plateau (Iana, 1970), falls within the following geographical coordinates: the parallel $43^{0}58`48,93``$ north latitude and the meridian $28^{0}10``05,12``$ east longitude (Figures - 1-3). This location in south-eastern Romania explains, the continental climate characteristics of the regions, which influences all environmental characteristics (Axini, 2006, 2009, 2011b; Brezeanu, 1997; Coteț, 1969).

The landscape has formed predominantly on Cretaceous and Sarmatian limestone, on Precambrian basement lithology and covered by a thick blanket of 40 m of Quaternary loess. The Preterozoic foundation is composed of crystalline schists and sedimentary superstructure, which are distinguished by two types of Paleozoic-Mesozoic and Neozoic formations.

Paleozoic Silurian formations are composed of clay schists with Devonian diaclases, consistion of thick marl clay, marl-limestone, etc. Mesozoic formations are composed of alternating calcareous and detritic deposits. Jurassic Period strata are composed of alternating limestone and diatomites. The Cretaceous period is represented by reef limestone and, marl-limestone, with sand, glaucenic sandstones, and microconglomerates in the middle strata, and marl clay at the base. Uppermost strata are dominate by debris facies with calcareous sandstones, microconglomerates, chalk, etc. These formations have been subjected to folding with foundation blocks revealing wavy structure.

In South Dobrogea, the Conacu-Negreşti Valley is located on a north-west to south-east axis. It is a *"canara"* (Iana, 1973), a term specific to Dobrogea, and meaning a valley generally short, narrow, with limestone slopes, high and steep walls with small caves, partly covered with SubMediterranean xerophyte meadows and scrub forest vegetation.

The Conacu-Negreşti Lake is of recent geological origin, formed by natural damming. Sixty years ago catastrophic flooding occurred after heavy rains, and water from Plopeni Lake located in the south and at an altitude higher than Conacu-Negresti Valley, overflowed into it. Alluvium was deposited by the flood, and the lake formed and is maintained by groundwater sources in the valley and precipitations (Basarabeanu, 1969; Gâștescu & Breier, 1969; Godeanu, 2002; Axini, 2011b).

Until 2003, the valley was known only from the geographical and geological field studies and research of Mrs. Dr. Sofia Iana, University of Bucharest, on the Negru -Vodă Plateau. In 2003, the "Monachus" Group of Scientific Research and Environmental Education, Constanta, Romania developed a study and research project on the biodiversity of the Conacu-Negresti Valley. The „Monachus" G.S.R.E.E. effort, became a permanent research program, undertaking new research and public education projects for environmental protection of this valley.

4. Biodiversity of Conacu-Negrești Valley

Conacu-Negreşti Valley, part of South Dobrogea, is distinguished by spectacular landscape beauty and is characterized by rich and diverse assemblage, with many rare or endemic species specific to the Dobrogea Province. Its significance also is derived from its geological, geomorphological and paleontological characteristics.

The valley previously was dominated by one dense forest of pubescent oak (*Quercus pubescens*), the remnants of which can be seen on the lake bottom. The proof that the valley was dominated by an oak forest is the angle of inclination of both limestone walls of the valley and the presence of herbaceous and shrub plant and invertebrates species, which normally live together in a oak forest (Axini et al., 2010).

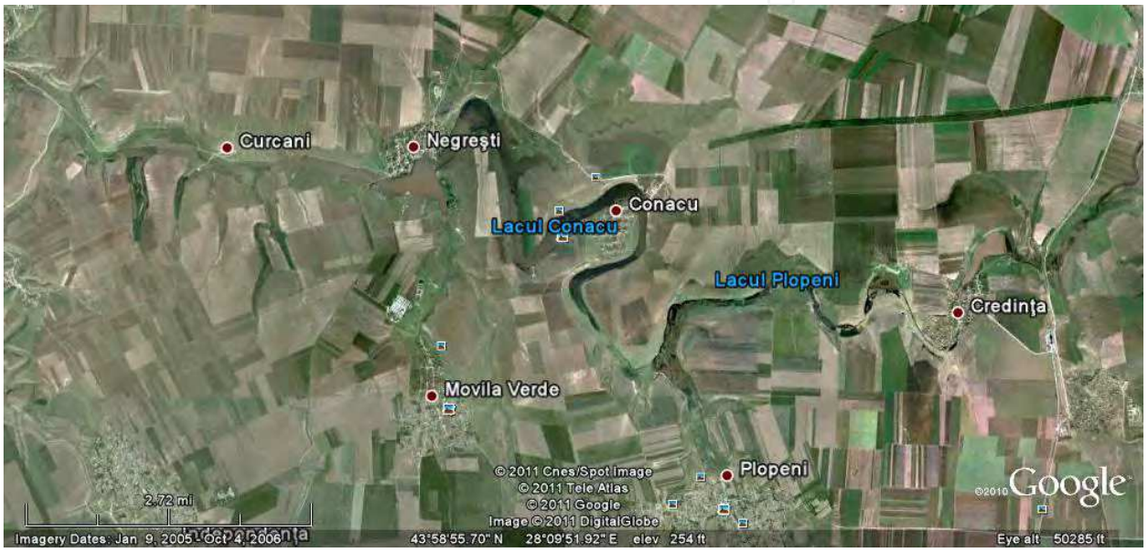


Fig. 3. Conacu-Negrești Valley (from Google Earth)

Thus far, we have detected a total of 301 plant species, among 32 orders and 62 families (Andrei, 2003; Axini, 2009a, 2009b; Ciocâlan, 2000a, 2000b; Cristurean & Lițescu, 2002a, 2002b; Morariu & Todor, 1972; Prodan, 1935, 1936a, 1936b; Prodan & Buia, 1966; T. Săvulescu (ed), 1952-1976; Todor, 1968; Tutin et al. (ed), 1964-1980a, 1964-1980b, 1996).

In numerical order, the families represented the largest number of species are: *Compositae* - 42 taxa, *Graminaceae* - 30 taxa, *Labiatae* - 25 taxa, *Caryophyllaceae* - 14 taxa; *Rosaceae, Leguminosae* and *Cruciferae* families, each of them with - 13 taxa (Figure 4).

The dominant shrub species in the valley include: *Prunus spinosa* L. and *P.* (*Padus*) *mahaleb* (L.) Borkh. (Fam. Rosaceae Juss.), - both shrub species found only the large canyon (one of the two canyons in the south-west of the valley); *Crataegus monogyna* Jacq. (Fam. Rosaceae Juss.), found on the plateau, on walls with southeast and northeast aspect (all three in the central valley), and in the large canyon of the south-west of the valley; and *Cornus mas* L. (Fam. Cornaceae Link.), found only in the small canyon (other canyon in the south-west of the valley, which is lower compared to that mentioned above) (Axini, 2011b).

Invasive plant species also occur in the region, including: *Ailanthus altissima* (Mill.) Swingle (Fam. Simaroubaceae L. C. Rich.), *Elaeagnus angustifolia* L. (Fam. Elaeagnaceae R. Br.),

Gleditshia triacanthos L. (Fam. Cesalpiniaceae), *Hedera helix* L. (Fam. Araliaceae Vent.), *Robinia pseudacacia* L. (Fam. Leguminosae Juss.), and *Morus* sp. (Fam. Moraceae Lindl.). These species occur on the limestone walls, plateaus, grassy hills and in the canyons of the southwest part of the valley (Axini M., 2011b).

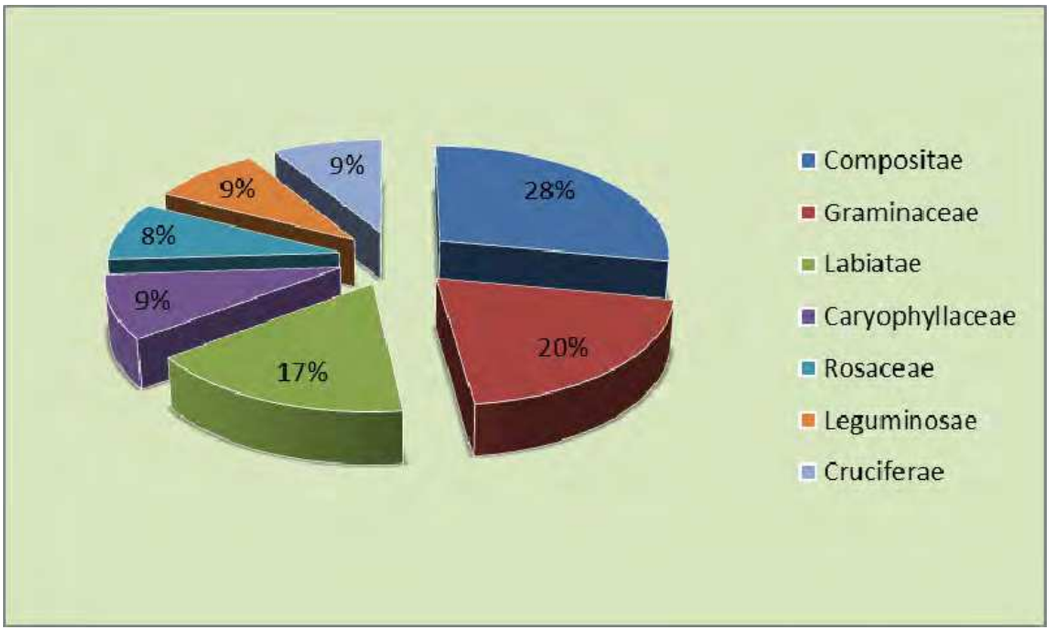


Fig. 4. The proportion of plants families with the highest number of species identified in the valley so far

Conacu-Negreşti Valley hosts many species of invertebrates, of which we so far have identified a total of 101 terrestrial and aquatic species, belonging to 17 orders and 57 families (Figure 5). Of these, insects dominate with 70 taxa, followed by gastropods with 22 taxa (Axini, 2006, 2009b, 2011a, 2011b; Axini & Skolka, 2010; Axini et al., 2010; Chiriac & Udrescu, 1965; Müller, 2002a, 2002b; Müller & Tomescu, 2002; Skolka, 2002, 2008). Of all groups of insects identified, the dominant order is Diptera, including nine families, followed by the Heteroptera with seven families, and Coleoptera with six families. The Lepidoptera and Himenoptera each are reprezented by four families (Figure 7; Skolka, 2002, 2008; Skolka et al., 2005). Among the Heteroptera, only the aquatic taxa have been identified thus far. Among those, *Hebrus pusillus* Fallen (Hebridae) is a rare species, known so far only from the Danube Delta (Axini, 2006, 2009b, 2011b; Axini & Skolka, 2010; Kiss, 2002).

Of the gastropods, identified thus far, the 22 species include, both terrestrial and aquatic taxa among, nine families in three orders (Figure 6; Axini, 2006, 2009b, 2011a; Axini & Skolka, 2010; Grossu, 1986, 1987; Müller, 2002a; A. Negrea, 2002). Of these Mollusca, two are endemic, seven are relicts, and two taxa are rare. One species (*Helix pomatia* Linnaeus - Helicidae) is of European importance and included on the Habitats Directive and Bern Convention lists.

Coleoptera are well represented in Dobrogea fauna, with both terrestrial and aquatic forms. In terms of species from Conacu-Negreşti Valley, they are little known to date with - 11

species belonging to 6 families. Among those species identified, 4 species are important: *Platambus maculatus* Linnaeus is of Euro-Central Asian afinity, *Hydroporus dobrogeanus* Ieniştea is endemic to Dobrogea, and *Cybister lateralimarginalis* De Geer is of Euro-Siberian afinity, (all three species are in the Dytiscidae), and *Cerambyx cerdo* L. (Cerambycidae) is an **endangered** and **rare** species, characteristic of wooded areas (Figure 8). This species is affiliaded with the oak forest in the valley (Cojocaru & Popescu, 2004; Nițu & Decu, 2002; Panin, 1957; Panin & N. Săvulescu, 1957).

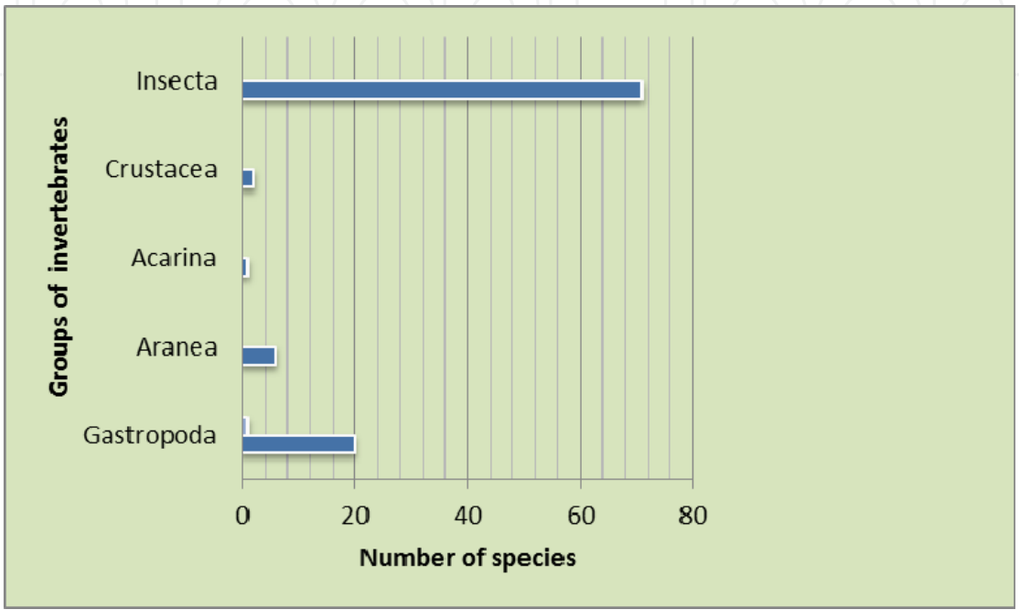


Fig. 5. Groups of invertebrates identified to date in the valley

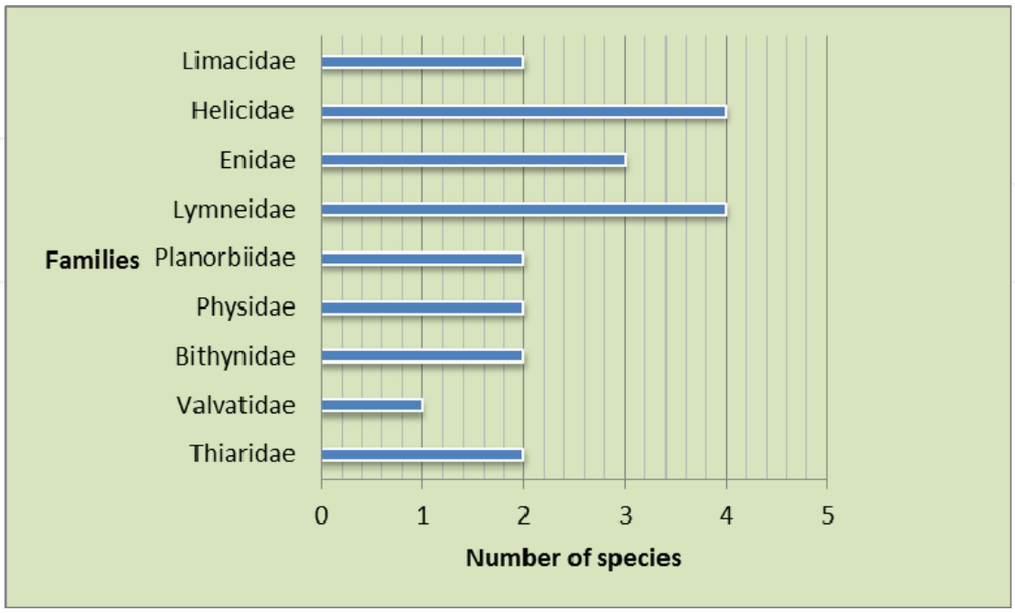


Fig. 6. Families of gastropods found in the valley

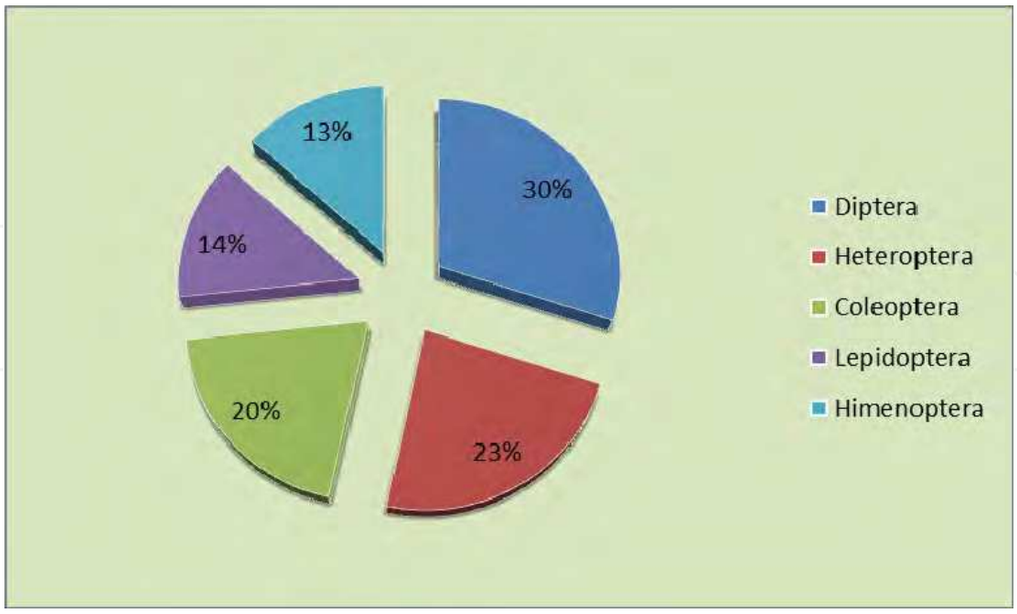


Fig. 7. The proportion of insects families with the highest number of species identified in the valley



Fig. 8. *Cerambix cerdo* identified on a grassy hill in the south-west corner of the valley (photo. M. Axini, 2009)

Lepidoptera are numerous species in Dobrogea, but are less studied in the Conacu-Negreşti Valley – 7 species belong to 4 families. One species larvae are adapted to aquatic environments - *Parapoynx stratiotata* L. (Fam. Crambidae). It was identified only in the Danube Delta (Căpuşe, 1968; Ruşti, 2002) and its presence in the lake indicated that the valley is a former arm of the Danube River. This, also is evident from field observations on the shape and orientation of the valley and canyons and geological data.

Until now, a total of 150 species of vertebrates have been detected, including: 13 species of fish, 7 species of amphibians, 12 species of reptiles, 94 species of birds, and 24 species of mammals) (Figure 9).

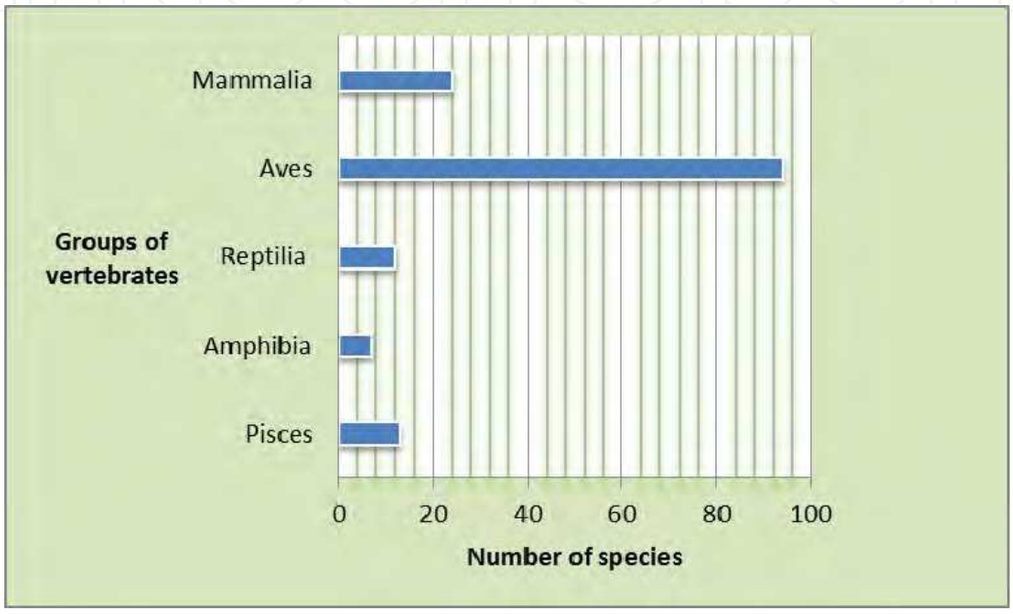


Fig. 9. Groups of vertebrates identified to date in the valley

Reptile populations are well represented in the Conacu-Negreşti Valley (Iftimie, 2001, 2005). Lizards include: *Lacerta (Podarcis) taurica* Pallas (Lacertidae) is abundant and occupies numerous habitats - on the walls of limestone cliffs in the day, on limistone tablelands, in the southwest canyons of the valley (Figure 10); *Lacerta trilineata dobrogica* Fuhn et Mertens (Lacertidae), a rare and localized - species characteristic of Dobrogea (Figure 11); *Lacerta (Podarcis) muralis maculiventris* (Lacertidae) is a **rare** and localized species (Figure 12). Turtles are represented by *Testudo graeca ibera* Linnaeus (Fam. Testudinidae Gray), a **vulnerable** species in Europe (Figure 13) and snakes are represented by *Dolicophis caspius* Gmel. (Colubridae Boulenger) , a **vulnerable** species in Romania, what inhabits limestone walls.

Podarcis muralis subsp. *maculiventris* was found only in wooded areas and with rocky walls in southern and northern Dobrogea, while in the Conacu-Negreşti Valley it inhabits only northeast facing limestone wall in the middle of the valley. *Lacerta (Podarcis) muralis* is a **rare** and localized species, in Dobrogea by subspecies *maculiventris*.

Testudo graeca ibera is a Dobrogean turtle, monument of nature, is abundant on plateaus and also in the canyons. The same cannot be said about *Emys orbicularis*, the water turtle, which is declining due to anthropogenic factors.



Fig. 10. *Lacerta taurica* from the limistone plateau in central valley (photo. M. Axini, 2009)



Fig. 11. *Lacerta trilineata dobrogica* (photo. M. Skolka, 2009)

The number of birds identified thus far in the valley include 32 families. Larks are most abundant but are more or less sedentary, migrating only in very cold winters. However, lark populations from Conacu-Negresti Valley are in numerical decline due to the anthropogenic activities.

Among the bird species of conservation concern identified in the valley thus far are: *Ardeola ralloides* Scopoli, *Ixobrychus minutus* Linnaeus (Ardeidae), *Ciconia ciconia* Linnaeus

(Ciconidae), *Burhinus oedicnemus* Linnaeus (Burhinidae), *Sterna hirundo* Linnaeus (Sternidae), *Melanocorypha calandra* Linnaeus (Alaudida), *Lanius minor* Gmelin (Laniidae), *Dendrocopos syriacus balcanicus* Hemprich et Bibr. (Picidae) (Bănică, 2006; Birds Directive; Flocea, 2004; Munteanu, 2005).



Fig. 12. *Lacerta (Podarcis) muralis maculiventris*, from the limestone wall of the central valley, with north-eastly aspect (photo. M. Skolka, 2009)



Fig. 13. *Testudo graeca ibera* from the limestone plateau in the central valley (photo. M. Axini, 2009)

Among the mammal species identified in the valley is the ground squirrel, *Citellus citellus* Pallas (Sciuridae), which is an endemic species to Europe and which inhabits steppe grasslands. Unfortunately, the species is in decline due to expansion of agricultural activities. In the valley, it occurred until recently as a large population, but currently it is in decline due to its popularity (recreation area) that led to the increasing number of tourists and fishermen. It is a species of conservation interest and require more rigurous protection (Habitats Directive, Annex 2, 4 and Natura 2000). The same applies to the mole *Talpa europaea* (Botnariu & Tatole, 2005; Habitats Directive; Iordache et al., 2004; Murariu, 2005). The ground squirrel occupies fragmented habitat by the Carpathian Mountains in: Pannonian Basin and the southeastern part (southern Romania, Bulgaria, Moldova and Ukraine). It is a critically endangered species due to the pronounced population declines and requires more rigorous protection (Habitats Directive, Natura 2000).

Among carnivorous mammals, foxes - *Vulpes* sp. - are more common and manages to survive despite human impacts on their habitats. They burrow in sandy canyon walls. In contrast, wolves, *Canis lupus* Linnaeus, are in decline throughout southern Dobrogea due to exntense deforestation. In the past, Cobadin had extensive forests of oak, and a large population of wolves. Records of *Canis aureus* exist, which entered the study area from Bulgaria.

4.1 Rare and endemic plants of Conacu-Negrești Valley

A total of 12 rare and endemic plant species have been detected in the valley (Table 1; Dihoru & Dihoru, 1994; Dihoru & Negrean, 2009; Făgăraș et al., 2010; Olteanu et al., 1994).

Orders	Families	Species
Ranunculales	Ranunculaceae	*Adonis volgensis* Steven ex DC.
Urticales	Urticaceae.	*Parietaria serbica* Pančˇ
Centrospermae	Caryophyllaceae	*Dianthus pseudoarmeria* M. Bieb.
		Minuartia bilykiana Klokov in Kotov
		Silene exaltata Friv.
Ligustrales	Oleaceae	*Jasminum fruticans* L.
Tubiflores	Labiatae	*Satureja coerulea* Janka in Velen
Sinandrales	Compositae	*Achillea clypeolata* Sibth. et Sm
		Centaurea napulifera Roch.
		Scolymus hispanicus L.
Liliales	Liliaceae	*Ornithogalum oreoides* Zahar.
Graminales	Graminaceae	*Koeleria lobata* (M. Bieb.) Roem. & Schult.

Table 1. Rare and endemic plant species identified from the Conacu-Negrești Valley

4.1.1 *Adonis volgensis* Steven ex DC. (Ranunculaceae)

Adonis volgensis Steven ex DC. (syn. *Adonis vernalis* L. subsp. *volgensis* (Steven ex DC.) Korsh; *Anemone cicutaria* Gandoger; *Adonanthe volgensis* (Steven ex DC.) Chrtek & Slavíková) (Figure 14) is a perennial plant, up to 45 cm high. Its leaves have toothed lobes; and

reproduces sexually, with direct or/and indirect pollination by insects. Its fruits and seeds are dispersed by ants. This species blooms in April-May (Szabó, 1973).



Fig. 14. *Adonis volgensis* (photo. M. Axini, 2009)

It is a heliophyte and xerophyitici species, widespread in the plains and hills, on dry, sunny soils that are neutral in pH and low in mineral nitrogen soils, in steppe grasslands (Szabó, 1973).

In Romania, it was occurs in: Transylvania, Moldavia and Dobrogea. In Dobrogea it was previously known only from the northern region, between Jurilofca and Gagebischi Liman, where it was identified by G. Grințescu, Romanian botanist, under the name *Adonis villosa-vernalis* (copy found in Herbarium of Romanian Institut of Biology of Romanian Academy in Bucharest, BUCA), and it was found Tulcea (identified by the same botanist as the *A. walziana*). In the southern region, it occurs near resorts close to the Conacu-Negrești Valley(Basarabi, Fântânița-Murfatlar Reserve and Cobadin) (Dihoru et al., 1965; Grecescu, 1898; Zahariadi, 1964).

In Conacu-Negrești Valley, *Adonis volgensis* was detected only on a limestone plateau ($43^0 59` 19,11`` N, 28^0 19` 42,60``$), approximately in the center of the valley. On the plateau edges, in the east, southwest, southeast, east, agro-ecosystems may threaten this species (Figure 15). There, it co-occurss with: *Asperula tenella* Heuff. ex Degen (Rubiaceae), *Adonis flammea* Jacq. (Ranunculaceae), etc..

Adonis volgensis is continental element, with geographical range in south-eastern Europe, from southeastern Hungary to the Central Ural Mountains, northeast Anatolia and Central Asia (Tutin et al., 1964-1980, 1996).

The scientific and practical importance of *Adonis volgensis* are high, because it is the medicinal and toxic plant, and it listed as vulnerable (VU), in Romania at the southwestern limit of its distribution.

Unfortunately, *Adonis volgensis* is threatened by reduction and degradation of its habitats by grubbing and overgrazing, expansion of agricultural area and exccessive collections. These impacts haves, lead to population reduction. To these impacts can be added natural factors related to the biology of the species, with low seeds production, failure of vegetative propagation, and occasional attack by microscopic fungi.



Fig. 15. Limestone plateau that supports *Testudo graeca ibera* and *Adonis volgensis* (Google Earth)

4.1.2 *Parietaria serbica* Panč (Urticaceae)

Parietaria lusitanica L. subsp. *serbica* (Pančić) P.W. Ball (syn. *P. serbica* Pančić, *P. chersonensis* Grec.; Figure 16) is an annual plant (T), 5-30 cm tall, that reproduces sexually and has indirect anemophilous pollination and fruit and seeds dissemination in its habitats. It blooms from May – September (Dihoru & Negrean, 2009).

Parietaria serbica lives on rocks and stones, and is shade-loving, often occurring in cracks in rocks. It is a calciphile, that grows in hilly and sub-mountainous areas. It does not typically co-occur with other species in the low quality, rocky soils.

In Romania, *Parietaria serbica* is widespread, especially in the south-west and southeast. In south-western Romania it has been detected in the Danube and Sohodol Gorges, since 1870, in various forms: *P. lusitatica*, *P. lusitatica* var. *chersonensis*, *P. chersonensis*, *P. serbica* (Păun et al., 1970; Păun & Popescu, 1978). It is known in Dobrogea from the central (Gura Dobrogei; Cheia) and southern regions (Canaraua Fetii Forest/Forest Reserve; Esechioi Forest Reserve; among rocks of Independenţa; in the Snakes Valley of Hagieni Forest; and among rocks, on banks and near sulphurous waters from Mangalia, near Tatlageac Lake) (Andrei & Popescu, 1966; Horeanu, 1973, 1976 a, 1976 b; Mihai et al., 1964; Ciocârlan, 2001; Dihoru & Negrean, 2009).

In the Conacu-Negreşti Valley, *Parietaria serbica* was identified in a small canyon ($43^0$59`34,68` N, $28^0$10`54,25`` E), at the entrance to Conacu Village - in the central eastern part of the valley, with north-western aspect (Figure 17) and a limestone wall with north-eastly



Fig. 16. *Parietaria serbica* from a small canyon in the eastern valley (photo. M. Axini, 2009)



Fig. 17. A small canyon, located at the entrance of Conacu Village, that supports *Parietaria serbica* (Google Earth, 2011)

aspect – near the central - west valley (43^{0}58`55,85`` N, 28$^0$09`38,10`` E) (Figure 18). The existence of cattle, sheep and goat herds may endanger the future existence of this species (Figure 17). There, it co-occurs with: *Asplenium ruta-muraria* L. (Polypodiaceae), *Minuartia bilykiana* Klokov in Kotov (Caryophyllaceae), *Sanguisorba minor* subsp. *balearica* **(Bourg. ex Nyman) Muñoz Garm. & C. Navarro** (Rosaceae) and other species.

Parietaria serbica is a Daco-Moesian-Dobrogean element, with **a range** in the northern part of Balkan Peninsula and Romania. **This subspecies** is endemic to Europe (Dihoru & Negrean, 2009). It is a threatened species (EN) (IUCN, 2010), of considerable scientific importance of the species due to its extreme rarity and small range in Europe. The species has practical importance as an herb with the same therapeutic properties as *Parietaria officinalis*.



Fig. 18. A limestone wall in the central valley (Google Earth, 2011)

Parietaria serbica is a short, annual species, that grows in small populations in rocks caverns, with low power propagation It is a plant that needs to rebuild their herd seasonally. The specimens of Romania is at the northern limit of the area. All this shows the degree of endangerment of the species.

Conservation measures include: prevent quarrying in its habitats, its conservation within protected areas, conservation of seeds in gene banks and growning the species in botanical gardens. In Romania is present in protected areas the Porțile de Fier Natural Park and Sohodol Gorges in southwestern Romania, and in Hagieni Forest, Canaraua Fetii, Gura Dobrogei, Cheia Natural Reserves in the territory of Dobrogea.

4.1.3 *Dianthus pseudoarmeria* M. Bieb. (Caryophyllaceae)

Dianthus pseudoarmeria M. Bieb. is a annual-biennual plant (T-TH), short hairy, and without vegetative shoots. It has dense array of pink flowers, with sexual reproduction through direct entomophilous pollination and well as anemophily, and through zoochory („eating" seeds by animals and their dissemination through faeces material). It blooms in June-July

(Dihoru & Negrean, 2009). *Dianthus pseudoarmeria* is a heliophyte, termophyte, calciphili species (Dihoru & Doniță, 1970; Dihoru & Negrean, 2009).

In Romania, it has been detected in Dobrogea and the Hanu Conachi (Galati). In Dobrogea, it has been detected: on Măcin Mountain, to Greci, to Cerna, on Pricopan Hill; to Babadag-Caugagia; the Dolojman Peninsula and on Saele Litoral Dunes (last, located in the Danube Delta Biosphere Reserve); the Histria Ancient City; on Capidava Hill; to Hârșova; to Medgidia; to Basarabi; in the Hagieni Forest, in southern of Cotul Văii, in Mare Valley and in Topolog Valley (Cristurean & Țeculescu, 1970; Prodan, 1935).

In Conacu-Negrești Valley, *D. pseudoarmeria* was identified on a south - facing limestone wall in the north-western portion of the valley (44^{0}00`21,29` N, 28^{0}08`51,34`` E; Figure 19). It also was reported on a grassy hill at the bottom of the lake, in the south-west (43$^0$58`38,28` N, 28$^0$10`15,43`` E; Figure 20) and in the large canyon in the south-west of the valley (.(43^{0}58`03,98` N, 28^{01}0`30,27`` E; Figure 20).

In these settings, it co-occurs with: *Achillea setacea* W. et K., *A. coarctata* Poir and *Carduus thoermeri* Weinm. (Compositae), and other species.



Fig. 19. *D. pseudoarmeria* location on the limestone wall in the north-westest portion of the valley (image from Google Earth)

It is a Pontic-Tauric-Balkan element, with an range centered in south-east Europe (Dihoru & Negrean, 2009). It is a low-risk species (LR) (IUCN, 2011).

It is an important ornamental plant and is grown in flower gardens.

Currently, *D. pseudoarmeria* is listed within the territory of protected areas, including: Hanu Conachi, Hagieni, Fântânița-Murfatlar, Măcin Mountain National Park, Danube Delta Biosphere Reserve. This species deserves protection due to habitat loss, and because it is parasitized by microbial fungi. "*Ex situ*" cultivation could be achieved in botanical gardens.



Fig. 20. *D. pseudoarmeria* locations on the limestone hill and the canyons of the south-west valley (Google Earth, 2011)



Fig. 21. *Minuartia bilykiana*, on a limestone wall (photo. M. Axini, 2009)

4.1.4 *Minuartia bilykiana* Klokov in Kotov (Caryophyllaceae Family Juss.)

Minuartia bilykiana Klokov in Kotov (syn. *M. tenuifolia*) (Figure 21) is a low-growing, glandulous, annual plant, less than 10 cm tall. It is patent-branched and reproduces sexually through entomophily, and with anemochory and zoochory dispersal. The stamens mature before the stigmatas. *M. bilykiana* presents hermaphroditic flowers, with female reproductive organs mature before the male reproductive organs. It blooms from May-July (Dihoru & Negrean, 2009).

It is a plant of hills, a heliophytic, thermophyte, who living on dry soils that are low in nitrogen, and in xerophytic meadows and on rocks (Dihoru & Negrean, 2009; Zahariadi, 1965).

In Romania, it has been documented thus far only in Dobrogea northeast of the town of Baia, Agighiol and Dolojman Peninsula, between 1966 and 2000, by Romanian botanist Gavril Negrean. In central and southern Dobrogea, it was identified, between 1961-2004, by the same botanist in north of the town of Topalu; on Allah-Bair Mountain; in the Seid-Orman Valley, near the towns of Târguşor and Palazu Mic; to Basarabi, Fântânița; to Techirghiol; in Hagieni Forest, Şerpilor Valley; to Mangalia, and the south-southeast of Cotul Văii, Mare Valley, „la Ic". In 1930 and 1933, Romanian botanist E. I. Nyárády identified this species on Allah-Bair Mountain and in Chirişlic, as *M. villosa*. Romanian botanist C. Zahariadi botanized at two resorts in southern Bassarabia (now Moldova), in 1929 and 1933, identifying it as *M. tenuifolia*. In 1965, he synonomized *M. tenuifolia* with *Minuartia bilykiana*.

In Conacu-Negreşti Valley, *M. bilykiana* was identified on a southeast – facing limestone wall in the central valley (43^{0}59`39,02` N, 28^{0}10`38,98``) (Figure 22). It also has been identified in the small canyon (43$^0$59`34,68` N, 28$^0$10`54,25`` E), located in the entrance of Conacu Village (Figure 17). It co-occurs with: *Satureja coerulea* Janka (Labiatae), *Ornithogalum oreoides* Zahar. (Liliaceae), and other species – on the limestone wall, and with: *Asplenium ruta-muraria* L. (Polypodiaceae), *Sanguisorba minor* subsp. *balearica* **(Bourg. ex Nyman) Muñoz Garm. & C. Navarro** (Rosaceae), *Parietaria serbica* Pančˇ. (Urticaceae), and other species – in the small canyon.

It is a Scythian element and is European endemite, with a range limited by the northern Black Sea (Dihoru & Negrean, 2009). Although it is a low-risk (LR) species (IUCN, 2011), its scientific importance is quite high, because it is a rare and ephemeral species, requiring future taxonomic research.

It requires protection because of reduced habitat availability and because it is parasitized by species of microbial fungi. As a conservation measure, "*ex situ*" cultivation in botanical gardens would help protect this species.

4.1.5 *Silene exaltata* Friv. (Caryophyllaceae)

Silene exaltata Friv. (syn. *Otites exaltata* (Friv.) Holub.) is a biennual to perennial plant species up to 2 m tall, with sexual reproduction and with entomophilous pollination and with anemochory dispersal. *S. exaltata* blooms from May to July (Dihoru & Negrean, 2009) and it is a heliophytic, thermophyte that lives on dry, neutral soils, on limestone slopes (Dihoru & Negrean, 2009).



Fig. 22. Location of *Minuartia bilykiana* in the study area on the southeast –facing limestone wall of the central valley (Google Earth, 2011)

In Romania, *S. exaltata* been identified thus far only in Dobrogea. It was reported between 1978 and 1983 by the Romanian botanist Gavril Negrean in the northern Dobrogea: on the Sărăturile Coastal Dunes from Sfântu Gheorghe, east of Enisala Ancient City, in the southeastern Heraclea Ancient City, north of „Caramanchioi" and on Dolojman Peninsula. In southern Dobrogea, it was detected in Agigea, Basarabi and in the Hagieni Forest (in "Cascaia"). Currently, *S. exaltata* is protected within Danube Delta Biosphere Reserve, Fântânița-Murfatlar Forest, Maritime Dunes Reserve from Agigea and Hagieni Forest.

In Conacu-Negrești Valley, *S. exaltata* was identified on the limestone plateau (43^{0}59`19,11` N, 28^{0}19`42,60``), in the centre of the valley where agriculture on the southern and eastern sides may threaten this species (Figure 15). It also has been identified in the small canyon in the south-west of the valley (43$^0$58`18,04`` N, 28^{0}10`11,11`` E) (Figures 20, 23), a canyon with expanded population of *Ailanthus altissima* (Mill.) Swingle - "cenușerul" (Simaroubaceae), a invasive species that is native to eastern Asia. This endangers the existence of *S. exaltata* and other native plant species existing in the small canyon. It co-occurs with: *Satureja coerulea* Janka (Labiatae), *Ornithogalum oreoides* Zahar. (Liliaceae), and other species – on the plateau, and with: *Dianthus armeria* (Caryophyllaceae), *Campanula bononiensis* L. (Campanulaceae), *Asperula tenella* Heuff. ex Degen (Rubiaceae), and other species – in the small canyon.

It is an East Balkan element, endemic to Europe, with a range in south-east Europe. In Wrigley`s opinion, this species replaces *S. chersonensis* from north of the Danube River, in Romania (Dihoru & Negrean, 2009).

It is an threatened species (EN) (IUCN, 2011) due to its reduced habitat area and attack by parasitic microbial fungi.

The scientific importance of this species is quite large due to its taxonomic relation to the *Otites* group in Romania and in relation to its corology/arealography as a European species.



Fig. 23. The small canyon and the large canyon in the south-west of the valley, where *S. exaltata* has been detected (Google Earth, 2011)

4.1.6 *Jasminum fruticans* L. (Oleaceae Family)

Jasminum fruticans L. is a shrub with evergreen leaves (M), up to 3 m in height, with 4-angular branches; alternate leaves with three-leaflets and yellow flowers. The plant is pollinated by insects and dispersed by zoochory. It blooms from May to July (Dihoru & Negrean, 2009). *J. fruticans* is a heliophytic, thermophyte species that occurs on dry, pH-neutral and low nitrogen soils, unassuming plant to the substrate, but sensitive to frost (Tarnavschi & Diaconescu, 1965, cited in Dihoru & Negrean, 2009). In Hagieni Forest Natural Reserve (Dobrogea), this species occurs with shrubs on steep slopes, including *Carpinus orientalis* („cărpiniță"), *Paliurus spina-christi* („păliur"), *Crataegus monogyna*, *Achillea clypeolata*, *Asparagus verticillatus*, *Asphodeline lutea*, *Ononis pusilla* and *Salvia ringens* (Cristurean & Țeculescu, 1970).

In Romania, this species is widespread only in central and southern Dobrogea. To date, it has been found near the Cernavodă, Medgidia, Basarabi, Fântâna Mare, Gura Dobrogei towns, south of Mircea Vodă Station, north of Şipote, north of Mangalia, south-southeast of Cotul Văii, 2 Mai Village, in Seid-Orman and Stârghina Forests. Also, it found on the territory of nature reserves: Cheia Jurrasic Reefs Nature Reserve, the Fântâniţa-Murfatlar Reserve, Dumbrăveni Forest, the „Canaraua Fetii" and „Esechioi" Forest Reserves, and the Hagieni Forest (Andrei & Popescu, 1966; Borza, 1944; Cristurean & Țeculescu, 1970; Dihoru et al., 1965; Dihoru & Negrean, 2009; Horeanu, 1976a; Morariu, 1961, as cited in Dihoru & Negrean, 2009; Parincu et al., 1998).

In Conacu-Negreşt Valley, it was identified only on the southeast facing limestone, in the central valley (43^{0}59`39,02` N, 28^{0}10`38,98``) (Figure 22). There, it co-occurs with: *Crataegus*

monogyna Jacq. (Rosaceae), *Prunus spinosa* L. (Rosaceae), *Achilea coarctata* and *Centaurea napulifera* Roch. (Compositae), *Satureja coerulea* Janka (Labiatae), *Ornithogalum oreoides* Zahar. (Liliaceae), and other species. The existence of the species in this valley is endangered due to several invasive species including: *Gleditshia triacanthos* L. Leguminosae), *Ailanthus altissima* (Mill.) Swingle (Simaroubaceae), *Elaeagnus angustifolia* L. (Elaeagnaceae).

J. fruticans is a Mediterranean element, with a range represented by the South Europe (Dihoru & Negrean, 2009) and is a vulnerable species (VU) (IUCN, 2011).

The plant has a great scientific importance due to its highty isolated range, which indicate its great age (Boşcaiu, 1976, cited in Dihoru & Negrean, 2009).

It also is threatened by its small populations, lack of suitable habitat, the impacts of parasitic microbial fungi. These factors indicate that specific conservation measures should be undertaken, including both "*in situ*" and "*ex situ*" propagation options.

4.1.7 *Satureja coerulea* Janka in Velen (Labiatae Family Juss.)

Satureja coerulea Janka in Velen (Figure 24) is a sub-shrub (Ch) up to 25 cm tall, with deep roots; hairy stems and linear, ciliate leaves what are 1,5-2 mm wide. This species has pink fowers 7-10 mm wide, is self-pollinated and its fruits and seeds are disseminated by zoochory. *S. coerulea* blooms from July to September (Dihoru & Negrean, 2009).



Fig. 24. *Satureja coerulea* identified on the limestone plateau located in the central valley (photo. M. Axini, 2009)

S. coerulea is a heliophytic, thermophytic, calciphile and is ultra-xerophyle species who occurs on dry, neutral soils, on hills, in arid rocks meadows, and on rocks.

In Romania, this species is widespread only in Dobrogea. To date, it has been reported from the Măcin Mountains, the Babadag Plateau, the Urlichioi, Limanu, Adamclisi and Sevendic Valleys, on the southern shore of Tatlageac Lake, to Basarabi, Negru Vodă, Cheia, Casian, Gura Dobrogei, Palazu Mic, Castelu, Medgidia, Mangalia and Adamclisi. It is found within several protected areas: the Măcin Mountains National Park, the Cheia Jurassic Reefs, the Fântânița-Murfatlar Forest, the Hagieni Forest and the Dumbrăveni Forest (Borza, 1944; Burduja & Horeanu, 1976, as cited in Dihoru & Negrean, 2009; Dihoru & Doniță, 1970; Horeanu, 1976b; Morariu, 1970, as cited in Dihoru & Negrean., 2009; Răvăruț, 1961, as cited in Dihoru & Negrean, 2009; Mihăilescu–Firea et al., 1965, as cited in Dihoru & Negrean, 2009; Parincu et al., 1998; Țopa & Marin, 1968, 1970, 1973; Țopa & Marin, 1981, as cited in Dihoru & Negrean, 2009; Zahariadi, 1965).

In Conacu-Negrești Valley, *S. coerulea* was identified on the southeast facing limestone wall (43^{0}59`39,02` N, 28^{0}10`38,98``) (Figure 22) and on the limestone plateau (43$^0$59`19,11` N, 28$^0$19`42,60``) (Figure 15), both located in the central valley. Here, it co-occurs with: *Crataegus monogyna* Jacq. (Rosaceae), *Prunus spinosa* L. (Rosaceae), *Jasminum fruticans* L. (Oleaceae), *Achilea coarctata* and *Centaurea napulifera* Roch. (Compositae), *Minuartia bilykiana* Klokov in Kotov (Caryophyllaceae), *Ornithogalum oreoides* Zahar. (Liliaceae), and other species. In this valley, the species is endangered by non-native species: *Gleditshia triacanthos* L. (Leguminosae), *Ailanthus altissima* (Mill.) Swingle (Simaroubaceae), *Elaeagnus angustifolia* L. (Elaeagnaceae).

S. coerulea is an Scythian-Thracian-Anatolian element, with a range encompassing southeastern Europe (Dihoru & Negrean, 2009) and is a vulnerable species (VU) (IUCN, 2011).

The plant has practical importance as a decorative species and of importance in bee-keeping for its melliferous nectar production.

Although, it is conserved within protected areas, as mentioned above, *S. coerulea* requires aditional conservation measures, both „*i*n situ“ and „ex situ“, including cultivation in botanical gardens and population restauration. Such actions are warranted because it tipically forms small populations and its rock surface habitats has been reduced.

4.1.8 *Achillea clypeolata* Sbth. et Sm. (Compositae)

Achillea clypeolata Sibth. et Sm (syn. *A. alexandri-borzae* Prodan) (Figure 25) is a perennial plant (H) with leaves in one plane, larges incisions that reach the median rib; inflorescences with peduncles 2 mm long, yellow flowers; sexual vegetative reproduction, with many stems growing from a single root; entomophilous and anemophilous pollination, and dispersal of fruits and seeds in its habitats. It blooms from June to July. It preserved well by vegetative reproduction by rhizomes. By yellow flowers and compact inflorescences, the species can be confused with *A. coarctata* Poiret and with *A. thracica* Velen. This latter species is a European endemite, a Dobrogean-Thracian element with potential for existence in the valley. *A. clypeolata* hybridizes with *A. neilreichii*, *A. setacea*, and *A. pannonica* (the first species identified in the valley), demostrating the vigurous nature of this species (Dihoru & Negrean, 2009; Prodan, 1931, 1939).

A. clypeolata is a heliophytic, thermophyte what occupies dry, neutral soils, in arid meadows (Cristurean & Ionescu-Țeculescu, 1970; Dihoru & Doniță, 1970).



Fig. 25. *Achillea clypeolata* identified on the limestome plateau located in the central valley (photo. M. Axini, 2009)

A. clypeolata is a Balcanic element and a European endemit to Albania, Bulgaria, Greece, Serbia, Muntenegru, Romania, and Turkey (Richardson, 1976, as cited in Dihoru & Negrean, 2009). It is listed as a critically endangered species (CR) (IUCN, 2011). In Romania, this species is widespread only in Dobrogea. To date, it has been identified from Babadag, Jurilovca, Ceamurlia de Sus, Mangalia and the Coroanei Valley, Cotul Văii (Mare Valley, in the south) and Allah-Bair Hill, although subsequent searches have failed to detect it there. It is present in the Hagieni Forest Reserve (Ciocârlan & Costea, 1997; Mititelu et al., 1968, as cited in Dihoru & Negrean, 2009; Prodan, 1931; Prodan & Nyárády, 1964, as cited in Dihoru & Negrean, 2009).

In Conacu-Negrești Valley, it was found only on the limestone plateau located in the central valley (43^{0}59`19,11` N, 28^{0}19`42,60``) (Figure 15). There, it co-occurs with: *Achillea setacea* W. et K. and *Echinops ritro* L. ssp. *ruthenicus* (M. Bieb.) Nyman (Compositae), *Salvia nutans* L. (Labiateae), *Allium saxatile* MBieb. (syn. *Allium globosum* MBieb ex DC) (Liliaceae). A agricultural practice to the west, southwest, southeast and east sides, endanger the future existence of this species.

The plant is economically important, as a decorative plant, and has been identified as important to the plant genetic fund. In addition, it has scientific importance as it reaches the north-eastern limit of its limited world range. Because of the reduction of Dobrogea steppes habitats by plowing and because it is parasitized by the microbial fungi, this species requires additional conservation protection.

4.1.9 *Centaurea napulifera* Rochel (Compositae)

Centaurea napulifera Rochel (Figure 26) is a short, perennial plant (H), only10-15 cm tall, what spreads by rhizomes and sometimes runners. It has thickened roots, leaves with "felt" (tiny)

white-silver hairs, on its lobe-shaped or lyre-shaped, basal leaves arranged in a rosette. *C. napulifera* undergoes vegetative reproduction via its long, thin runners. It reproduces sexually, with both anemophilous and entomophilous (by ants) pollination. This species blooms in April-May. Two subspecies of *C. napulifera* are recognized in Romania in Flora Europaea: *C. napulifera napulifera* and *C. napulifera thirkei* (Schults Bip.), and two forms: *tuberosa* (Vis.) Gugler and *albiflora* Prodan (Ciocârlan, 2000; Dihoru et al., 1965, as cited in Dihoru & Negrean, 2009; Prodan, 1930).



Fig. 26. *Centaurea napulifera* from the limestome plateau located in the central valley (photo. M. Axini, 2009)

It is Dobrogean-Balkan element and is reported to be endemic species in Europe (Bulgaria, Greece, Serbia, Muntenegru, Romania, Moldova, Turkey) (Dostál, 1976, as cited in Dihoru & Negrean, 2009). In Romania, this species is widespread only in Dobrogea. To date, it has been detected in the Consul Mountain and on Denis-Tepe Hill, from the Casimcea Plateau and Caugagiei Valley, at the base of Slovan-Bair Hill, from Casimcea, Seidorman, Tatlageac, Sevendic Valleys, and from Basarabi, Mangalia, Adamclisi, Medgidia, Valul lui Traian, and 23 August Village. It is found within the following protected areas: the Cheia and Fântânița-Murfatlar Reserves, the Dumbrăveni and Hagieni Forests, Valul lui Traian, Allah-Bair Hill, Consul Hill, and Măcin Mountain National Park (Andrei & Popescu, 1966; Dihoru, 1965, as cited in Dihoru & Negrean, 2009; Dihoru & Doniță, 1970; Horeanu, 1975; 1976a, 1976b; Morariu, 1970, as cited in Dihoru & Negrean, 2009; Prodan, 1939; T. Săvulescu, 1953; Zahariadi & Negrean, 1969).

C. napulifera is a heliophytic, thermophytic, calciphile, a xerophytic species that lives on dry, neutral –pH soils. Species grows in green lands with rare trees, on dry meadows, and by bushes (Dihoru & Doniță, 1970). In the Conacu-Negrești Valley, it was found only on the

limestone plateau located in the central valley (43^{0}59`19,11` N, 28^{0}19`42,60``) (Figure 15). There, it co-occurs with: *Achillea setacea* W. et K. and *Echinops ritro* L. ssp. *ruthenicus* (M. Bieb.) Nyman (Compositae), *Salvia nutans* L. (Labiateae), *Allium saxatile* MBieb. (syn. *Allium globosum* MBieb ex DC) (Liliaceae).

C. napulifera is a vulnerable species (VU) (IUCN, 2001) due to agricultural alteration of its habitat in the west, southwest, southeast and east sides of the study area.

This species has considerable scientific importance because its unusual life history characteristics particularly is vegetative reproduction and short life cycle. It also has practical importance as a decorative plant and for its nectar and pollen production during spring.

The plant is endangered in part due to its short stature, which does not allow for widescale dispersal of fruit (usually only a few cm), and it may be attacked by microbial fungi. To these threats are added the impacts of intensive livestock grazing and other agricultural alternation of its natural grassland habitats.

Consequently, protective measures are needed, including research, resolution of its subspecific taxonomic, and propagation in protected settings, including botanical gardens.

4.1.10 *Scolymus hispanicus* L. (Asteraceae)

Scolymus hispanicus (Figure 27) is a thorny and hairy biennual to perennial species (TH-H). It was divided basal-leaves, basal leaves and petiolate, sessile leaves - on the stem and yellow flowers. *S. hispanicus* reproduces sexually, with anemophilous and entomophilous pollination, and dissemination of fruit and seeds through anemochory and gravity. It blooms from June-August (Nyárády, 1965, as cited in Dihoru & Negrean, 2009; Walters, 1976, as cited in Dihoru & Negrean, 2009).



Fig. 27. *Scolymus hispanicus* from the south end of the lake (photo. M. Axini, 2009)

It is a heliophytic thermophyte that lives on dry, nitrogen rich soils, on cliffs, and in ruderal settings (Dihoru & Doniță, 1970).

In Romania, this species has been detected thus far only in Dobrogea and occasionally, localy near Sibiu and Giurgiu (where it was reported as adventitious). In Dobrogea, it was detected in the coastal zone (Sulina, north of Periboina to Portița, Chituc and Saele Litoral Dunes –Danube Delta; Midia Peninsula; "3 Papuci" Beach, south of Constanța; Agigea; Eforie Nord; Eforie Sud; Tuzla; Mangalia; 2 Mai and Vama Veche Villages; Tatlageac and Techirghiol Lakes), of north (Măcin) and of south of Dobrogea (Sevendic Valley; Limanul Valley, Mare Valley –south-southeast of Cotul Văii, Hagieni Forest) (Borza, 1944; Dihoru & Negrean, 1976, 2009; Ionescu-Țeculescu & Cristurean, 1967; Morariu, 1963, 1965; Prodan, 1939).

In the Conacu-Negrești Valley, it has been detected on the southeast facing limestome wall in the north-west valley (44^{0}00`21,29` N, 28^{0}08`51,34`` E) (Figure 19) and on the eastern shore of Conacu-Negrești Lake, between Conacu Village and terminal side of the lake (43$^0$59`07,38` N, 28$^0$11`02,90`` E) (Figure 28).

It is a Mediterranean element, with a range from southern Europe up to northern France (Albania, Azores, Baleares Islands, Bulgaria, Corsica, Crete, France, Greece, Spain, Italy, Serbia, Muntenegru, Portugal, Romania, Ukraine, Sardinia, Sicily, Turkey) (Walters, 1976, as cited in Dihoru & Negrean, 2009).

It is a plant with practical importance, as a medicinal herb, it is used as a diuretic and a treatment for eczema and liver failure; it also is used as a ornamental and a food plant.

It is regarded as a **vulnerable species** (VU) (IUCN, 2011). The species is characterized by small populations and therefore is threatened by loss of habitats. For these reasons, this species needs protection, both *„in situ"* (currently, there is within Danube Delta Biosphere Reserve) and *„ex situ"* (through cultivation in botanical gardens).

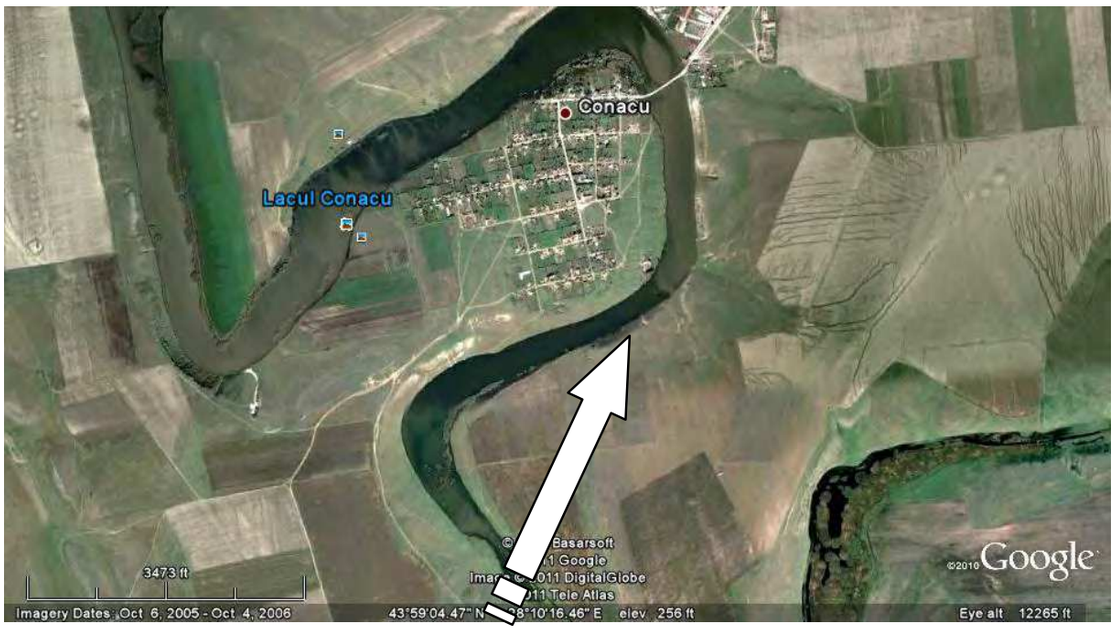


Fig. 28. Location of one site at which *Scolymus hispanicus* was detected (Google Earth, 2011)

4.1.11 *Ornithogalum oreoides* Zahar. (Liliaceae)

Ornithogalum oreoides (Figure 29) is a rhizomatous plant (G), with bulbs with free scales, canaliculate leaves that are smooth edgeds. It is polinated by insects and its fruit and seeds are disseminated by gravity; however, it also undergoes vegetative reproduction. *Ornithogalum oreoides* blooms in -May (Zahariadi, 1966; Zahariadi, 1980, as cited in Dihoru & Negrean, 2009).

It is a heliophytic, calciphile, and is a subxerophytice species (Dihoru & Doniță, 1970).

In Romania, this species has been reported thus far from Dobrogea and in refugia in other parts of Romania. In Dobrogea, it was found to Caraorman litoral sands from the Danube Delta, on the Babadag Plateau, and in „Canarale" from Hârșova, Gura Dobrogei, the Cheia Reserve, on Allah-Bair Hill, in the „Canaraua Fetei" and in the „Esechioi"Forest Reserves, and elsewhere (Andrei & Popescu, 1966; Ciocârl, 1994; Cîrțu, 1979; Dihoru & Doniță, 1970; Horeanu, 1976a; Lungeanu, 1972).

O. oreoides was detected in the Conacu-Negrești Valley only on the limestone plateau located in the central valley ($44^{0}00`21,29`$ N, $28^{0}08`51,34``$ E) (Figure 15).

This is Scythian element, and is endemic in Europe. This range extends across the Northwestern Black Sea in Bulgaria, Romania, Moldova, Ukraine (Dihoru & Negrean, 2009).

It is classified as a vulnerable species (VU) (IUCN, 2011). Although an important ornamental and nectar producing species, it is a rare and is highly restricted to specific microsites, and may be attacked by fungi. Consequently, it deerves protected measures, both "in situ" (currently, it is in the territory of Cheia Jurassic Reefs Reserve, „Canaralele" from Hârșova Port, Gura Dobrogei Cave, and the Danube Delta Biosphere Reserve) and "ex situ" (through cultivation in botanical gardens and through restocking).



Fig. 29. *Ornithogalum oreoides* on the limestone plateau located in the central valley (photo. M. Axini, 2009)

4.1.12 *Koeleria lobata* (M. Bieb.) Roem. & Schult. (Poaceae)

Koeleria lobata (syn. *K. brevis* Steven; *K. degenii* Domin) is a perennial brush-shaped plant (H), sometimes forming small clusters. It has bulbous root base and many stems emerge from a single root. Along with its vegetative reproduction capacity, it is amemophilous and its seeds are dispersed by gravity and by „seed eating" animals. It blooms from May-July (Dihoru & Negrean, 2009).

K. lobata is a heliophytic, thermophytic, calciphile, an ultraxerophytic species that grows on dry, pH-neutral soils (Andrei et al., 1965; Cristurean & Ionescu-Țeculescu, 1970; Ionescu-Țeculescu & Cristurean, 1967; Dihoru & Doniță, 1970).

In Romania, this species has been reported only from Dobrogea: in the Lupilor Litoral Dunes, the Letea Forest, Razim Lake, the Dolojman Peninsula from Danube Delta, Carvan Hill, the Babadag Plateau, the Măcin Mountains, Gura Dobrogei, Cheia Reserve, Valul lui Traian, Fântânița-Murfatlar, the Şerpilor Valley from Hagieni Reserve, and in south-southeast of Mare Valley from Cotul Văii (Andrei et al., 1965; Andrei & Popescu, 1966; Dihoru & Doniță, 1970; Dihoru et al., 1965; Ionescu-Țeculescu, 1967; Horeanu C., 1973, 1975, 1976a; Sârbu et al., 2000).

In the Conacu-Negrești Valley, it was detected on a limestone wall (alt. 89 m) from the bottom of the lake in the south -central valley, on south-eastern exposure (43^{0}58`53,66` N, 28^{0}10`09,29`` E) (Figure 30). Its presence is confirmed in the large canyon, on the limestone wall in the northwest valley and on the limestone plateau above the canyon, where co-occurs with *Parietaria*.



Fig. 30. Location of the limestone wall that supports *Koeleria lobata* (Google Earth, 2011)

K. lobata is a Continental element, with a range extending from Turkey to Southeast Russia in Turkey, Bulgaria, Romania, Ukraine, Crimeia, eastern Russia (Dihoru & Negrean, 2009).

This spesies is a vulnerable species (VU) (IUCN, 2011) due to loss of its habitats, and it is of scientific interes because of its vegetation reproduction. It also is a pioneer species, stabilizing rocky lands.

Protective measure are necessary, including - “in situ“ through preservation in reserves, such as the Hagieni Forest, Fântânița-Murfatlar, the Babadag Forest, the Uspenia Monastery, and Măcin Mountains National Park. It also may require “ex situ“ protection through cultivation in botanic gardens.

5. Conclusions

Data presented in this work were compiled from field and laboratory studies in 2003–2010. This research is part of a program developed by the "Monachus" Group for Research and Environmental Education in Constanța, Romania in partnership with the Faculty of Natural Sciences, “Ovidius“ University in Constanța, Romania, aimed at identifying the biodiversity of the Conacu-Negresti Valley, the biology and ecology of which was not recognized until 2003.

Our field and laboratory studies lead us to conclude that the Conacu-Negreşti Valley is characterized by a rich and diverse flora and fauna, with numerous rare and endemic species for Romania and Dobrogea. Many of these species require improved management, protection, and preservation status. At present, the valley does not have designated conservation status, and a part of the lake is leased and managed as a fish farm. Human impacts on different aspects may contribute to future declines and even disappearance of some rare species. Therefore, urgent protective measures should be taken that will lead to improved biodiversity conservation and landscape protection in this valley.

Due to its unique nature, which result from its geological and paleontological past, the valley hosts many species important to science and human well-being, and some of which have not yet been described. Such efforts will be the focus of future work in this research program.

6. Acknowledgment

As director of the reseach and environment education program on Conacu-Negreşti Valley, I want to thank my colleagues on the research team: Associate Professor Ph.D. Marius Skolka, Ph.D. Gavril Negrean, Professor PhD. Rodica Bercu, and Ph.D. Gabriel Bănică.

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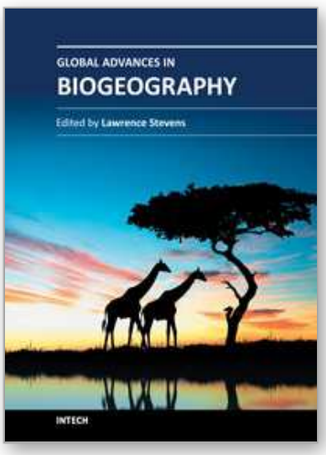
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Global Advances in Biogeography

Edited by Dr. Lawrence Stevens

ISBN 978-953-51-0454-4
Hard cover, 360 pages
Publisher InTech
Published online 30, March, 2012
Published in print edition March, 2012

Global Advances in Biogeography brings together the work of more than 30 scientific authorities on biogeography from around the world. The book focuses on spatial and temporal variation of biological assemblages in relation to landscape complexity and environmental change. Global Advances embraces four themes: biogeographic theory and tests of concepts, the regional biogeography of individual taxa, the biogeography of complex landscapes, and the deep-time evolutionary biogeography of macrotaxa. In addition, the book provides a trove of new information about unusual landscapes, the natural history of a wide array of poorly known plant and animal species, and global conservation issues. This book is well illustrated with numerous maps, graphics, and photographs, and contains much new basic biogeographical information that is not available elsewhere. It will serve as an invaluable reference for professionals and members of the public interested in global biogeography, evolution, taxonomy, and conservation.

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Monica Axini (2012). Rare and Endemic Species in Conacu-Negresti Valley, Dobrogea, Romania, Global Advances in Biogeography, Dr. Lawrence Stevens (Ed.), ISBN: 978-953-51-0454-4, InTech, Available from: http://www.intechopen.com/books/global-advances-in-biogeography/rare-and-endemic-species-in-conacu-negre-ti-valley-dobrogea-romania

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