

SYNANTHROPIC SPECIES IN THE OUTSKIRTS OF BUCHAREST

Sanda Lițescu, Gabriela Pascale

Key words: *segetal plants, ruderal plants, synanthropic species, Cernica, Romania*

INTRODUCTION

The study of ruderal and segetal plant associations registered new impulses only during the first half of last century. These associations comprise synanthropic species whose existence and distribution are linked to human activities, as their name indicates (lat. “simul” – together; gr. “anthropos” – man). They may be autochthonous when they are parts of the Romanian flora, or allochthonous if belonging to other floras.

Synanthropic associations develop in townships and around them, on barren ground, at the border of roads and park alleys, in agricultural cultures and on their margins, in courtyards of habitations in rural sites, in green spaces between apartment houses in urban conditions, in green spaces of parks and gardens (more or less well managed) of the city, on courtyards of industrial enterprises, on the banks of lakes and rivers where fishing is practiced etc. Everywhere, where human activities are going on weeds are present, as are named popularly segetal and ruderal plants.

In current conditions anthropic influence on vegetal diversity is ever stronger, a consequence being the enhancing of adaptation capacity of weeds and the arising of resistant biotypes (*Sorghum halepense* (L.) Pers., *Matricaria perforata* Mérat.), so that research on biology, ecology and arealogy of weeds becomes a stringent necessity.

Under certain circumstances weeds become significant competitors of agricultural crops and ornamental species. The main method in the struggle against weeds is the use of herbicides, substances which may act by secondary effects upon cultivated plants, sometimes over a long period, and implicitly upon people and animals which eat them. On the other hand utilization of herbicides or other means of control on a large scale could be “over-efficient” leading to the total disappearance of some segetal and ruderal species from the flora of Romania.

The Global Strategy for Plant Development (April 2002 – the Hague), integrated part of the Convention of Biodiversity Conservation provides among objectives proposed for the period 2002 – 2010 that at least for 30 % of cultivated land the management must assure also the conservation of vegetal biodiversity.

For the conservation of vegetal diversity under these conditions, the presence of weeds must be

accepted, taking however care that the economically supportable threshold of damage should not be surpassed. There must be accepted a “partnership” between cultivated plants and weeds.

For this stage of our study took into consideration only the eastern zone of Bucharest, especially the localities Pantelimon, Cernica, Tânganu. This zone is delimited by the lakes Pantelimon and Cernica, the villages Cernica and Tânganu (on the left hand side of the highway Bucharest – Cernica – Tânganu), and by the highway Bucharest – Brănești – Pasărea (Fig. 1).

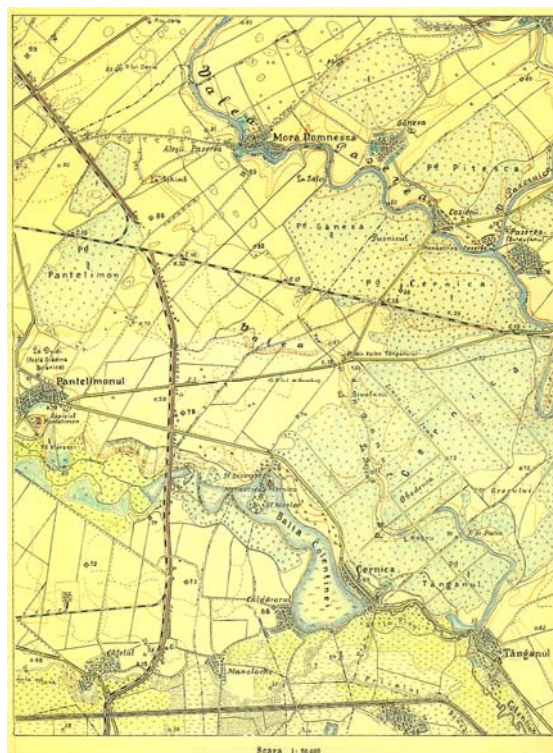


Fig. 1. Map of the region

MATERIAL AND METHOD

The inventory of ruderal and segetal invasive taxa was established by direct observations on the field. These observations were done in the period from May 2004 to October 2005. It was verified also if and when the identified species had been cited prior, and the abundances recorded at the respective time. For comparison we chose the works of Zaharia Panțu – 1908 (8), Iuliu Morariu – 1943 (7), Ioan Cristorean (6).

As for nomenclature we adopted that of “Flora Europaea” (9) and of “Flora Ilustrată a României” (4).

For establishing and evaluation of the invasive statute of some of the listed species we took into account the latest recommendations of experts in problems of invasional ecology of plants, these recommendations being agreed by “Invasive Species Specialist Group” (ISSG), an integrated part of Species Survival Commission, acting within The World Conservation Union (IUCN).

RESULTS AND DISCUSSIONS

In the zone under study a significant weight have agricultural land areas occupied by dwellings and industrial enterprises.

Natural ecosystems are represented here by several woods (Tânganu, Cernica, Pustnicul, Pasărea), relics of the ancient Vlăsiei forest, which occupied once the whole territory.

We included also the lakes Cernica and Pantelimon, considered as natural ecosystems.

Ruderal plants develop on uncultivated land, on waste ground, on spots where various organic residues are abandoned, in the proximity of animal breeding farms, on more or less trodden soil, on the margins of plant cultures, penetrating also hold crops. Segetal plants grow mainly in non-hoed cereal cultures, but also in hoed ones, as there is no definite borderline between both categories (ruderal and segetal).

From among characteristic properties of synanthropic plants we name above all their increased resistance against various adverse conditions of the environment. The majority of synanthropic plants are annuals and/or adventitious. They produce a huge number of germs, either sexually (seeds – a single individual of *Amaranthus retroflexus* L. produces one million seeds), or asexually (rhizomes, stolons, slips etc.), mainly in the case of perennial species.

Within the architectural structure of space of human settlements (urban and rural) several zones of synanthropic vegetation can be distinguished.

So, on void ground, at the border of Cernica forest, next to the asphalt covered highway, on the margins of village – roads, on waste grounds, we met with numerous characteristic ruderal species as for example: *Polygonum aviculare* L., *P. mite* Schrank (in ditches, on wetter ground), *P. persicaria* L., *Rumex crispus* L., *R. sanguineus* L., *Setaria pumila* (Poir.) Schultes, *Erodium cicutarium* (L.) L'Hérit, *Conyza canadensis* (L.) Cronq., *Linaria vulgaris* Miller, *Daucus carota* L., *Lolium perenne* L., *Echinochloa crus-galli* (L.) Beauv., *Veronica hederifolia* L., *Matricaria perforata*, *Torilis arvensis* (Hudson) Link., *Vicia cracca* L., *V. sativa* L., *Holosteum umbellatum* L., *Sambucus ebulus* L. (Fig. 2).

Those stretches of wood on the territory under consideration are crossed by numerous roads (some wide enough to allow the use of cars, trucks, tractors

etc.) and paths, the glades of the woods are favorite picnic places of the population. For these reasons we identified in Cernica forest a number of ruderal species, characteristic for compacted, trodden soil, as are *Polygonum aviculare* L., *P. mite*, *Cirsium vulgare* (Sav.) Ten., *Echinochloa crus-galli*.



Fig. 2. Waste ground in Cernica village

At the border of Cernica forest, on the length delimited by the highway Bucharest – Cernica – Tânganu, we saw *Gleditschia triacanthos* L., which some 50 years ago had been planted in a single row at the border of the forest, having the role of protection. Presently it forms a band of several tens of meters depth, invading the forest.

The ecotopes installed around dwelling-buildings are occupying stretches of land where organic residues are thrown away, but also the ground in front of housing-courtyards, where the ruderal vegetation is exceedingly varied and rich in species (Fig. 3).



Fig. 3. Stretches of land with organic residues

On the ground at the edge of Cernica village, situated on the exondate banks of lake Cernica, where domestic rubbish and residues are abandoned, we identified a number of autochthonous species (*Rumex crispus*, *Galinsoga parviflora* Cav., *Abutilon theophrasti* Medik., *Solanum nigrum* L., *Phragmites australis* (Cav.) Stendel., *Humulus lupulus* L., *Rubus caesius* L.), but also some isolated specimens of allochthonous species, escaped from cultures. Some of these were herbaceous annuals (*Zea mays* L., *Solanum tuberosum* L., *Lycopersicon esculentum* Miller), other were woody species at the stage of shrubs (2-3 m) like *Prunus domestica* L., *Pyrus communis* L., *Cerasus avium* (L.) Moench.

On the greens in front of dwellings vegetation is more varied. Here we encountered more mesophilous species, whose presence is explained by the rainy climatic conditions of the current year and by the existence of a draining ditch at the edge of the road. Here belong: *Rorippa sylvestris* (L.) Besser, *Poa pratensis* L., *Stellaria media* (L.) Vill., *Ranunculus repens* L., *Trifolium repens* L. etc. Here too we meet with euophilous species (*Capsella bursa-pastoris* Medik., *Plantago lanceolata* L.) but also with xerophilous species (*Polygonum aviculare*, *Eragrostis minor* Host., *Bromus tectorum* L.). Besides these we found also isolated specimens, stemming from allochthonous floras (*Calendula officinalis* L., *Commelina communis* L.).

In technogenic ecotopes, resulting from industrial activities, like courtyards of factories, industrial land, synanthropic vegetation is not well differentiated. This is due to the fact that numerous industrial units (bread-baking factories, filling stations for refreshing and alcoholic drinks are of rather recent date in the area under study, so that the genesis of phytocoenoses is in an incipient stage of development. For all that some, few specimens from several species can be identified: *Conyza canadensis*, *Cardaria draba* (L.) Desv., *Polygonum aviculare*, *Chenopodium album* L.

From the segetal flora we identified in land cultivated with non-hoed species the following: *Vicia pannonica* Crantz., *V. sativa*, *V. villosa* Roth., *Lathyrus tuberosus* L., *Consolida regalis* S.F. Gray, *Papaver rhoeas* L., *Nigella arvensis* L., *Centaurea cyanus* L., *Anthemis austriaca* Jacq. etc.

In hoed cultures we identified also: *Papaver dubium* L., *Amaranthus blitoides* S. Watson, *A. retroflexus*, *Hibiscus trionum* L., *Portulaca oleracea* L., *Holosteum umbellatum*, *Chenopodium album*, *Ch. hybridum* L., *Anagallis arvensis* L., *A. foemina* Miller, *Capsella bursa-pastoris*, *Heliotropium europaeum* L., *Veronica polita* Fries., *V. persica* Poiret, *Lamium amplexicaule* L.

In the zone under study we identified also, besides those already cited, some non-native species, which do not belong to the Romanian flora (*Parthenocissus quinquefolia* (L.) Planchon, *Sedum dasyphyllum* L., *Calendula officinalis*, *Ailanthus altissima* (Miller) Swingle). The abundance of these was however very low, they being seen only as isolated specimens in 1-2 locations.

The aquatic vegetation is mainly characterized by the sometimes exuberant multiplication of some species: *Potamogeton crispus* L., *P. lucens* L. and *Ceratophyllum demersum* L. There must be added several macroalgae, especially from the genera *Cladophora* and *Spirogyra*. During the summer (7-15 July) we observed a "flowering" due to *Cyanobacteria* (*Mycrocystis*, *Anabaena*).

These species are part of the autochthonous flora, but we think that signaling their invasive behavior in both lakes is of importance, this phenomenon being observed also in other aquatic ecosystems, influenced by the direct or indirect intervention of man (e.g. the semi – running lakes of

the Porțile de Fier I and II). Must be mentioned that lakes Cernica and Pantelimon are in the neighborhood of the villages of the same names and even with the outskirts of Bucharest, they being polluted by rubbish, residues etc.

Likewise we observed a continuous tendency of clogging by alluvium in Cernica lake, where compact, mono-dominant populations of *Phragmites australis* advance toward the centre of the lake, tending to form two separate lakes by clogging. At the same time appear floating fixed patches of vegetation in the central zone (fig. 4).



Fig. 4. Mono-dominant population of *Phragmites australis*

The analysis of synanthropic coenoses is rather difficult, because the composition of phytocoenoses changes from year to year on the same ground, depending on the kind of culture wherein they develop, on the means of control and agricultural measures applied (in the case of species growing in cultures), or depending on modifications of ecologic conditions (deliberate or not) in the case of other locations.

CONCLUSIONS

1. Synanthropic plants cause ecologic changes by anthropogenizing (synanthropisation) of the local flora.
2. Man contributes, deliberately or not, to the spreading of some plants, sometimes detrimental to others, this leading to cosmopolitization of the species a uniformity of floras, disturbing by this way evolution.
3. The number of synanthropic species – segetal and ruderal – identified in the zone under study was estimated to over 150, but may vary significantly from year to year and from season to season.
4. Most of the species are ruderal, among them appearing frequently also non-native species.
5. The number of segetal species is smaller, and because of excessive use of means of control (herbicides) some species were no more found. Such an example is that of *Agrostemma githago* L., cited in older works (6, 7, 8) as present and even frequent and invasive in cultures of non-hoed cereals.

6. Technogenic ecotopes don't show a significant variety of synanthropic species at present; therefore we consider that it is necessary to continue the monitoring of this zone.
7. From among allochthonous species considered as invasive for the Romanian flora, we identified a relatively small number, the degree of invasiveness being low, we consider therefore that they are not presenting a danger for the local flora, at least in the near future.
8. A certain degree of dangerousness is presented by *Gleditschia triacanthos*, which was cultivated at the edge of the forest having a protective role – however nowadays it occupies a belt of ca. 20 m breadth advancing into the forest, where we found juvenile stems of ca 1 m in height.
9. The analysis of synanthropic coenoses and the monitoring of associations of these types, is rather difficult, because the composition of phytocoenoses is varying from year to year on the same ground.

REZUMAT

Lucrarea prezintă, pe scurt, situația actuală a vegetației sinantropice din regiunea Pantelimon – Cernica – Tânganu, localizată la est de București. Este caracterizată vegetația ruderală de pe marginea drumurilor din localități și din pădure, din curțile locuințelor rurale, de pe terenurile virane și maidane, dar și vegetația segetală din culturile agricole și ornamentale și de pe marginea acestora. De asemenea este prezentată vegetația sinantropică specifică ecotipurilor tehnogene precum și tendința de cosmopolizare a unor habitate naturale.

REFERENCES

1. ANASTASIU P., NEGREAN G., 2005 - Alien invasive plants in natural and semi-natural habitats from Romania (Abstract). XVII International Botanical Congress, 17-23 July 2005, Vienna, Austria, pg. 193.
2. ANASTASIU P., NEGREAN G., 2005 - Naturalized and invasive alien woody plants in Romania" (Abstract). 8th Symposium on the Flora of Southeastern, Serbia and Neighboring Regions. 20-24 June 2005, Nice, Serbia, pg. 105.
3. ANASTASIU P., al., 2005 - Plante ornamentale naturalizate și invasive în diferite tipuri de habitate din România. Simpoz. Stiint. Annual "Horticultura – Știință, calitate, diversitate și armonie", 27-28 mai 2005, Iași, in press.
4. CIOCĂRLAN V., 2000 - Flora ilustrată a României – *Pteridophyta* et *Spermatophyta*. 2nd edition, Edit. Ceres, București, 1138pp+1 Addenda, ISBN 973-40-0495-6.
5. CIOCĂRLAN V. & al., 2004 - Flora segetală a României. Edit. Ceres, București, 351pp., ISBN 973-40-0657-6.
6. CRISTUREAN I., 1958 - Contribuții la cunoșterea florei și vegetației de la Cernica, unpublished.
7. MORARIU I., 1943 - Asociații de plante din jurul Bucureștiului cu observații asupra răspândirii lor în țară și mai ales în Transilvania. PhD thesis. Grăd. Bot. și Muz. Bot. al Univ. din Cluj, VM. XXIII, Cluj, p. 131–212.
8. PANȚU Z., 1908, 1910, 1912 Contribuțiuni la flora Bucureștilor și a împrejurimilor sale. An. Acad. Rom., Ser. II-t. XXXI, 192pp.; t. XXXII, 96pp.; t. XXXIV, București, Viena, Berlin, 164pp.
9. TUTIN T. G., BURGESS N. A., CHATER A. O., EDMONSON J. R., HEYWOOD V.H., MOORE D.M., VALENTINE D.H., WALTERS S.M. & WEBB D.A. (eds), 1964-1980; 1993 - Flora Europaea, Volumes 1-5; Vol. 1, 2nd edition, Cambridge University Press, Cambridge.

AUTHORS' ADDRESS

SANDA LIȚESCU, GABRIELA PASCALE – University of Bucharest, Faculty of Biology, Department of Botanic, Intrarea Portocalelor No 1-3, sector 6, 060101, Bucharest, România, e-mail: litescusanda@yahoo.com, pasgabi@yahoo.com