

A NEW CONTRIBUTION TO THE PHYTOCOENOLOGY OF THE SEA BUCKTHORN (*Hippophaë rhamnoides* L.) BUSHES

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Key words: phytocoenological novelties, bushes of *Hippophaë rhamnoides*.

Résumé: Cet ouvrage parle sur l'association *Sesleria (heufleriana) - Hippophaëum rhamnoides* nov. ass. qui se trouve dans le bassin de la rivière Milcov (département de Vrancea). Cette association se trouve sur un substrat constitué par des matières calcaires, quelque fois faiblement salées, représenté par des argiles, des marnes et des argiles marnoases qui présentent des minces infiltrations de sables gréses ou des niveaux de gypse. On rencontre un sol peu évolué cambique ou un sol peu évolué argillique pseudorendzinique, le microclimat de cette zone étant semi-aride.

Bien que cette association se trouve à l'étage néomoral, à cause des conditions écologiques spéciales, on peut observer ici l'installation d'une végétation mésoxérophile édiflée par deux espèces avec des caractéristiques semblantes: oligotrophiques et calciphiles. Cette association est différente de broussailles habituelles à *Hippophaë rhamnoides* situés dans les régions sous-carpatiques par son écologie spécifique et aussi par sa composition floristique.

Rezumat: Este descrisă o nouă asociație (*Sesleria (heufleriana) - Hippophaëum rhamnoides* nov. ass.) din zona Subcarpaților de curbură. Cele 10 releveuri (Tabelul I; releveul nr. 4 este considerat releveu nomenclatural tipic) au fost efectuate în bazinul Milcovului, pe versantul stâng al pârâului Curmătura, în raza comunei Reghiu-jud. Vrancea, la o altitudine de 425-550 m, cu expoziție predominant sudică. Substratul geologic este saturat în baze, constituit din materiale carbonatice, uneori ușor salifere și este reprezentat prin argile, marne și argile marnoase, cu unele infiltrații subțiri de nisipuri, gresii sau nivele de gipsuri. Solul este un erodisol cambic, erodisol argiloiluvial, erodisol cambic pseudorendzinic sau erodisol argiloiluvial pseudorendzinic. Microclimatul din zonă este aridizat din cauza condițiilor particulare: energie mare de relief, variații cu insolație puternică, substrat impermeabil care determină o scurgere rapidă a apelor din precipitații (ceea ce determină valori relativ mici ale umidității solului), iar solul este afectat de un proces avansat de eroziune.

În aceste condiții ecologice, deși ne aflăm în etajul nemoral, se instalează o vegetație mezoxerofilă dominată de *Hippophaë rhamnoides*, iar în covorul ierbaceu, care ocupă atât spațiile dintre tufșuri, cât și pe cel de sub tufșuri, dominantă este *Sesleria heufleriana*. Cele două specii au necesități ecologice asemănătoare (sunt oligotrofe, calcicole, etc.) și pot coexista fără o concurență evidentă, formând fitocenoză relativ stabile, care au fost încadrate în al. *Prunion spinosae*, ord. *Prunetalia*, cla. *Quercetea pubescenti-petraeae*. Această asociație se deosebește de asociația tipică de câtină albă din zona subcarpatică prin faptul că are în compoziția floristică, în afara speciilor caracteristice pentru cenotaxoni superiori, și multe specii edificatoare pentru *Seslerio-Festucion pallentis*.

Some investigations on the vegetational cover in the Curved Subcarpathians (Vrancea county) have been done during 1986-1991. On this occasion there were studied

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thoroughly phytocoenological researches on the sea-buckthorn scrubs (*Hippophaë rhamnoides* L.) [10, 11, 12]

The sea-buckthorn scrubs occupy relative spread surfaces in this zone, beginning with 80-90 m altitude up to 900-950 m altitude. For many times there these scrubs install as pioneer vegetation on degraded ground by landfalls, landslides and powerful erosion of the soil. They have a great power of extension and they can't be eliminated only by shade, *Hippophaë rhamnoides* being an absolute heliophyte plant [2, 6, 13]

In geobotanical literature more sea-buckthorn scrubs associations have been recorded in Europe [1, 4]: *Pyrolo-Hippophaëtum* J. M. Gehu 82 (on decalciphiluous dunes, in Holland), *Ligustro-Hippophaëtum* (Meltzer 41) Boerboom 60 (in Belgium), *Sambuco-Hippophaëtum* (Meltzer 41) Boerboom 60 (in Belgium and Holland), *Hippophaëo-Salicetum arenariae* Br.-Bl. et De Leuw 36 (in the Atlantic zone), *Sorbo aucupariae-Hippophaëtum maritimae* Cnojnaki 79 (in Poland). An important role as codominants species, in these associations, have *Hippophaë rhamnoides* ssp. *maritima* Soest., ssp. *fluviatilis* Soest. and ssp. *carpatica* Rousi [8]. In Romania there were quoted some phytocoenoses with *Hippophaë rhamnoides* ssp. *carpatica* and ssp. *caucasica*. Recent researches, which are not published yet, have identified more associations of sea-buckthorn in various combinations, especially in the dunes zone of the Danube Delta.

In Romania's vegetation 3 associations of sea-buckthorn have been described and identified [9]:

- Ass. *Hippophaë-Salicetum elaeagni* Br.-Bl. et Volk. 40, which occupies alluvial and sandy grounds in the river meadows in Moldavia, Valachia and Danube Delta.

- Ass. *Hippophaë-Berberidetum* Moor apud Mititelu et Barabaş 70 identified in Vrancea, too, in forest steppe zone, at Adjud [3; 7], but often met towards the south in the high plain of Râmnicu Sărat and in the basin of Slănic-Buzău.

- Ass. *Hippophaëtum rhamnoides* Borza 31 (syn. *Hippophaëtum* Issler 24). This association comprises the phytocoenoses of sea-buckthorn from Subcarpathian zone (nemorose belt) and depending in various ecological factors some floristic composition.

We have identified a special situation in the basin of Milcov river, on the left versant of Curmătura rivulet, in Reghin zone. The altitude is 425-550 m, the exposition being southern predominated and the soils are cambic regosol, argillic soil regosol, cambic-pseudorendzine regosol and argillic soil pseudorendzine regosol, average and strongly erosional soils. The geological substratum of this habitat is fully based saturated in bases, formed of calcareous materials, sometimes light salinized represented by clay, marl and marl-clay with thin intercalation of sand, sandstone or with levels of gypsum. The pedoclimatic conditions of this zone are, in a way, similar to those from the confluence of Tazlău with Trotuş or Buhuşi and Piatra Neamţ [5], where there are so called "avant-steppe islands", intrazonal mezoxerophytic enclaves of vegetation situated in nemorose zone.

The association installs itself on the slopes with powerful sunshine, which receives during the growing season over 87.5% of normal insolation. The powerful insolation

during summer determines higher registrations of medium thermic values with 07°C - 0°8C in the air and 1°C - 2°C at the soil surface. The big relative altitude of the relief and the strong inclination of the slopes on an impervious geological substratum determined the rapid flow of water from the precipitations and the strong erosion of the soil favouring a reduced infiltration and low values of soil moisture. In this way a dryness of the microclimate took place and in such peculiar conditions it could be individualize this type of phytocoenose enlightened by 2 species: *Hippophaë rhamnoides* and *Sesleria heufleriana*, which are dominants in those 2 distinct layers (shrub and herb layer).

Having similar ecological necessities and inexisting competition between edificator species, the association presents a relative stability. The shrub vegetation exists under the form of bunches, covering 45-85% the ground and it is dominated by *Hippophaë rhamnoides* ssp. *carpatica*. Besides this there are some other shrubs as: *Crataegus monogyna*, *Prunus spinosa* ssp. *dasyphylla*, *Rosa canina*, *Viburnum lantana*, *Euonymus verrucosa*, *Cornus mas*, etc., but young trees appear dissiminated as: *Ulmus minor*, *Acer campestre*, *Acer tataricum*, *Quercus pubescens*, *Quercus petraea* ssp. *polycarpa*, *Carpinus betulus*, *Fraxinus ornus*, *Pyrus pyraster*, etc.

The grass cover is discontinue, having a coverage of 45-75% and it occupies the spaces between shrubs, but it develops very well as a subordonate layer under woody vegetation. The dominant species *Sesleria heufleriana* is oligotrophic, mezophilic, calciphilous, subthermophilous plant and it coexists together with many species characteristic for all. *Prunion spinosae* SoÓ (30) 40, ord. *Prunetalia* Tx. 52 and cls. *Quercetea pubescenti-petraeae* (Oberd. 48) Jakucs 60; some of these species have a high constant: *Teucrium chamaedrys*, *Origanum vulgare*, *Carex divulsa*, *Calamintha clinopodium*, *Brachypodium pinnatum*, *Achillea distans*, etc.

What distinguishes this type of phytocoenose from typical sea-buckthorn shrubs in the Subcarpathian zone is the presence of a great number (25) of species characteristic for *Seslerio-Festucion pallentis* Klika 31 (including *Stipo(pulcherrimae)-Festucetalia pallentis* l. Pop 68), among them there are some that have superior indexes of constance and the total estimate abundance (*Poa compressa*, *Festuca rupicola*, *Euphorbia seguieriana*, *Melica ciliata*, *Asperula tinctoria*). A visible contribution to the formation of the herbaceous field stratum has the numerous xerophite and mezoxerophite species from *Festuco-Brometea*, characteristic for the meadows of the appropriate zone.

Having in mind the structure and the floristic composition of the described phytocoenoses as well as the peculiar ecological conditions and taking into account the relative coenotic stability of this type of sea-buckthorn shrub, our opinion is that the ass. *Seslerio (heuflerianae)-Hippophaëtum rhamnoides* nov. ass may be recognized on the bases of those 10 relevée (Table I: relevée no. 4 being considered nomenclatural typus) and we include it temporary in *Prunion spinosae*. The next researches are to decide upon the place of this association in coenotaxonomical system.

Quercetea pubescenti-petraeae										
Calamintha clinopodium	+	+	+	+	+	+	+	+	+	V
Brachypodium pinnatum	+	-	1	+	1	+	-	+	-	IV
Achillea distans	+	+	+	-	-	+	+	+	-	IV
Coronilla varie	+	-	+	+	-	+	+	+	+	IV
Campanula sibirica	+	-	+	+	+	+	+	+	+	IV
Lithospermum purpureo-coeruleum	+	+	-	+	-	-	+	-	+	III
Cynanchum vincetoxicum	+	-	-	+	+	+	+	-	-	III
Cornus mas	+	-	-	+	+	-	-	+	-	III
Thalictrum aquilegifolium	-	-	+	+	+	-	+	+	-	III
Nepeta pannonica	-	+	+	-	-	+	+	+	+	II
Dianthus armeria	-	+	+	-	-	+	+	+	-	II
Peucedanum cervaria	+	+	+	-	-	+	+	-	-	II
Quercus pubescens	+	-	-	+	-	+	+	-	-	II
Bilderdykia dumetorum	-	+	-	+	-	-	+	-	-	II
Thalictrum minus	-	-	+	-	+	-	+	+	-	II
Sorbus torminalis	-	-	+	-	-	+	-	-	+	II
Arabis turrta	-	+	-	+	-	-	-	-	+	II
Calamintha sylvatica	+	+	-	-	-	+	-	-	+	II
Lathyrus niger	-	-	-	-	-	+	+	-	+	II

Quercus petraea ssp. polycarpa (2; 3); Pyrus pyraster (4; 8); Fraxinus ornus (4; 9); Carlina vulgaris (2); Verbascum nigrum (1; 10); Inula hirta (2; 7); Geranium sanguineum (2; 7); Carex michellii (1; 3); Ranunculus polyanthemos (1; 3); Carex tomentosa (5; 7); Polygonatum odoratum (1; 9); Campanula cervaria (1; 10); Asparagus officinalis (6); Cytisus hirsutus (1); Acer tataricum (5; 6); Cytisus austriacus (10)

Carpino-Fagetea										
Acer campestre	+	+	-	-	+	+	-	-	+	III
Cruciata glabra	+	+	-	-	+	-	+	-	+	III
Astragalus glycyphyllos	-	+	+	+	-	-	-	+	+	III
Rubus hirsutus	-	+	-	+	-	-	+	-	+	II
Fragaria vesca	+	+	+	-	-	-	-	-	+	II
Carpinus betulus	+	-	-	-	-	-	-	+	+	II
Festuco-Brometea										
Poa angustifolia	+	1	+	1	+	+	1	1	1	V
Dorycnium herbaceum	+	+	1	+	+	-	+	+	+	V
Achillea collina	+	+	+	-	+	+	-	+	+	IV
Thymus pannonicus	+	1	+	+	-	1	-	+	+	IV
Carex humilis	+	-	-	-	+	1	+	+	+	IV
Agrimonia eupatoria	-	+	+	-	+	+	+	+	-	III
Festuca valesiaca	+	+	-	-	1	+	-	-	+	III
Botriochloa ischaemum	+	1	-	1	+	-	-	-	+	III
Plantago lanceolata	+	-	+	-	+	+	-	+	+	III
Hieracium pilosella	-	-	+	-	+	+	-	+	-	II
Asperula humifusa	+	+	-	+	+	-	-	-	-	II
Agopyron intermedium	-	-	-	+	+	-	+	-	-	II
Trifolium montanum	+	-	-	+	-	-	+	+	-	II
Stachys germanica	-	-	-	-	+	+	-	+	-	II

Euphorbia cyparissias (1; 2); Medicago minima (4); Carex praecox (1); Veronica prostrata (3); Centaurea micranthos (2; 6); Scabiosa ochroleuca (4; 10); Artemisia abinthium (5); Salvia nemorosa (1; 5); Hypericum perforatum (5; 10); Potentilla recta (5); Erysimum diffusum (1; 5); Galium verum (5; 10); Asperula cynanchica (5); Centaurea scabiosa ssp. spinulosa (10); Inula salicina (1; 5); Salvia verticillata (6); Trifolium campestre (7); Astragalus onobrychis (7); Potentilla reptans (8); Polygala major (9);

Seslerio-Festucion pallentis											
<i>Poa compressa</i>	+	+	+	+	+	+	+	-	1	1	V
<i>Festuca rupicola</i>	-	1	+	1	-	+	+	2	+	1	IV
<i>Euphorbia seguieriana</i>	+	+	-	+	+	+	-	+	+	+	IV
<i>Melica ciliata</i>	+	-	+	+	-	+	+	+	+	+	IV
<i>Asperula tinctoria</i>	+	+	-	+	+	+	+	+	-	-	IV
<i>Primula elatior</i>	-	+	+	-	-	+	+	+	+	-	III
<i>Silene nutans</i>	+	+	-	+	+	+	-	-	+	-	III
<i>Bupleurum falcatum</i>	-	-	+	+	-	+	+	+	-	-	III
<i>Galium mollugo</i> ssp. <i>erectum</i>	+	-	+	-	+	-	+	+	+	-	III
<i>Helianthemum nummularium</i>	+	+	-	-	+	+	+	-	-	-	III
<i>Bromus japonicus</i>	+	-	+	-	-	+	+	-	-	-	II
<i>Veronica austriaca</i> ssp. <i>jaquini</i>	-	-	+	+	+	-	-	+	-	-	II
<i>Erysimum odoratum</i>	-	-	-	+	-	+	-	-	+	+	II
<i>Cynanchum vincetoxicum</i>	-	+	+	-	+	-	-	+	-	-	II
<i>Stachys recta</i>	+	-	-	+	-	+	-	-	-	-	II
<i>Euphorbia epithymoides</i> (2; 9); <i>Cerastium arvense</i> (3; 7); <i>Peucedanum orcoselinum</i> (2); <i>Jurinea mollis</i> (8); <i>Scorzonera austriaca</i> (4; 9); <i>Cytisus nigricans</i> (4; 5); <i>Hieracium bifidum</i> (5); <i>Scabiosa lucida</i> (6); <i>Silene dubia</i> (5); <i>Achillea crithmifolia</i> (7)											
Syntaxa varia											
<i>Agropyron repens</i>	+	-	+	+	+	-	+	+	-	+	IV
<i>Viola hirta</i>	+	+	-	-	+	+	+	+	+	+	IV
<i>Trifolium repens</i>	+	-	+	-	+	+	+	-	-	+	III
<i>Calamagrostis epigeios</i>	+	1	+	-	+	-	-	1	-	+	III
<i>Lolium perenne</i>	-	+	+	-	-	+	-	+	+	-	III
<i>Lotus corniculatus</i>	-	+	-	-	+	+	+	-	-	-	II
<i>Pulmonaria mollis</i> (1); <i>Betonica officinalis</i> (4; 9); <i>Cirsium vulgare</i> (10); <i>Trifolium pratense</i> (10); <i>Daucus carota</i> (10); <i>Prunella vulgaris</i> (8)											