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## **Cereal weed communities in Lithuania and Poland: comparative characteristics and syntaxonomic aspects**

Valerijus RAŠOMAVIČIUS

In most European countries the syntaxonomic stage of plant cover evaluation is already completed and published. In Lithuania, however, such classification, based on floristic-ecological principles, is not very far advanced. The Lithuanian territory (65.2 thousand km<sup>2</sup>) is close to the Baltic Sea and, from the phytogeographic point of view, is a critical region: phytogeographic borders of various levels pass by or cross this territory.

The object of one particular study in this investigation is the classification of weed communities in cultivated fields in Lithuania. The obtained results are presented in this paper. From 1984 to 1987 weed communities of the main cultures (rye, wheat, spring crops, rootcrop and flax) growing in different ecological and agrotechnical conditions on the whole Lithuanian territory (53°53' an 56°27' NL, 20°58' and 26°50' EL) were investigated. More than 500 phytocenological records were included in tables and analysed. According to the floristic features the syntaxa were singled out.

This stage of hierarchic system creation is rather complicated. Problems arise to a researcher working in phytocenologically unexplored territory adjoining a region with an established vegetation structure. In our case, it was worthwhile to refer to the Polish system of syntaxa for weed communities of cultivated fields, adapting it to Lithuanian conditions. Cultivated field communities comprise usually eurytopic and eurychoric species. Because of noticeable climatic, orographic, pedologic and agricultural system differences arising in both countries, distribution areas of communities which have been described

in Poland cannot be stretched to the Northeast, i.e. to the Lithuanian territory. The object of this paper is to provide a basis for the differentiation of lower synsystematic units of cereal weed communities in Lithuania according to the Polish syntaxon system of weed communities in cultivated fields. The paper includes neither a detailed comparison of floristic composition, structure and other features of communities nor a wider discussion on natural conditions of both countries. For the Lithuanian cultivated field communities, the systematization of higher syntaxons by KORNAS (1950, 1977), adapted for Polish conditions, was used as one of the possible variants. A hierarchic system of syntaxons of Lithuanian cereal weed communities is as follows:

Class:	<i>Rudero-Secalieta</i> Br.-Bl. 1936
Order:	<i>Secali-Violetalia arvensis</i> Siss. (1943 ap. Br.-Bl. et R.Tx.) 1946
Suborder:	<i>Centauretalia cyani</i> (R.Tx. 1937) R.Tx., Lohm. et Prsg. 1950
Alliance:	<i>Aperion spicae-venti</i> R.Tx. ap. Oberd. 1949
Association:	<i>Spergulo-Veronicetum dillenii</i> (Wojcik 1965) Warcholinska 1981
Association:	<i>Vicietum angustifoliae-hirsutae</i> Nowinski 1964
Subassociation:	<i>setarietosum</i> <i>typicum</i> <i>chamomilletosum</i> <i>consolidetosum</i>
Association:	<i>Papaveretum dubii</i> Rasomavicius 1987
Subassociation:	<i>typicum</i> <i>veronicetosum</i>
Alliance:	<i>Triticion sativae</i> Krusem. et Vlieg. 1939
Association:	<i>Chaenorhino-Silenetum noctiflorae</i> Rasomavicius 1987

### Brief characteristics of syntaxa

#### **Ass. *Spergulo-Veronicetum dillenii* (Wojcik 1965) Warcholinska 1981**

Differential species: *Spergula morisonii*, *Teesdalia nudicaulis* and *Veronica dillenii*.

The analysis of references indicated that Polish authors first described segetal communities with such species as "communities with *Veronica dillenii*" (WOJCIK 1965, WARCHOLINSKA 1974, 1976), and later transferred them to the rank of association (WARCHOLINSKA 1981a,b). In central Poland this association was found in dry, poor, sandy soils. Communities of this association are in contact with communities from another segetal subatlantic association *Arnoserido-Scleranthetum* (Chouard 1925) R.Tx. 1937, characteristic to West and Middle European fields. Obviously, both the above mentioned fact and a certain resemblance in floristic composition moved WARCHOLINSKA (1976) to consider the "community with *Veronica dillenii*" as a variant of ass. *Teesda-*

*leo-Arnoseridetum minimae* (Malc. 1929) R.Tx. 1937 (syn. *Arnoserido-Scle-ranthesetum*), and later on to express his opinion that sometimes *Spergulo-Ver-onicetum* originate from *Teesdaleo-Arnoseridetum minimae* or (Libb. 1932) Krusem. et Vlieg. 1939 (WARCHOLINSKA 1981a). A poor floristic composition of the communities because of worsening conditions of habitats corroborates the conclusion.

In Lithuania, the communities of the association *Spergulo-Veronicetum dille-nii* are usually formed on ploughed up psammophytic communities and are not the derivatives of typical segetal communities, though the floristic compo-sition of the described communities is almost the same as that of Polish com-munities with *Veronica dillenii* (RASOMAVICIUS 1987a).

Evidently, the northeastern distribution boundary of the above discussed asso-ciation crosses southeastern Lithuania.

#### **Ass. *Vicietum angustifoliae-hirsutae* Nowinski 1964**

Characteristic species: *Vicia angustifolia* and *Vicia hirsuta*.

The communities *Vicietum angustifoliae-hirsutae* from the far western part of Poland (the island Wolin) were first described by NOWINSKI (1964). Later on he extended their distribution range along the Baltic Sea coast, farther to-wards the East (NOWINSKI 1965). The author characterized *Vicietum angusti-foliae-hirsutae* as an independent association, but at the same time regarded it as a subassociation of *Vicia angustifolia* and *V. hirsuta* of the most wide-spread segetal ass. *Vicietum tetraspermae* Krusem. et Vlieg. 1939 in Poland. The above mentioned association differed in the absence of the species *Vicia tetrasperma*, in the description and only in a sporadic occurrence of *Bromus secalinus*, *Polygonum tomentosum*, *Vicia villosa*, i.e. the characteristic spe-cies of *Vicietum tetraspermae*. It should be indicated, that NOWINSKI himself did not determine a rank of the communities he described. This problem in Polish agrophytocenological literature is not solved yet. In syntaxonomical summaries, *Vicietum angustifoliae-hirsutae* is regarded as the depauperate form of the association *Vicietum tetraspermae* (KORNAS 1977). On the other hand, either the correlation of both syntaxa is indicated, thereby recognizing *Vicietum angustifoliae-hirsutae* as the association (MATUSZKIEWICZ and FA-LINSKI 1967), or the problem is not under general discussion (MATUSZKIEWICZ 1984). A detailed description of the characteristics of communities of the in-vestigated association, except works mentioned by the author, was published by PAWLAK (1979) and BARTZ (1983).

A great number of articles dealing with peculiarities of floristic composition,

distribution and inner differentiation of communities of the association *Vicetum tetraspermae* have been published (WOJCIK 1965, 1975, 1978, WARCHOLINSKA 1974, 1981a,b, DUBIEL and TRZCINSKA-TACIK 1984, etc.). This association is rather widespread in central Poland. In western and eastern Poland it is substituted by the subatlantic association *Aphano-Matricarietum* R.Tx. 1937, and the more continental association *Consolido-Brometum*, respectively. According to WOJCIK (1984), the association *Consolido-Brometum* occurs only in far northeastern Poland, and its distribution center must be located in the fields of Lithuania. This opinion was confirmed by the articles on weed plants in Lithuania (REGEL 1939) and geobotanical records (STANCEVICIUS 1959). According to them, it is possible to single out *Consolido-Brometum* on the Lithuanian territory. However, we have come to the conclusion that it is inexpedient to distinguish at present a large association *Consolido-Brometum* as among its characteristic species only *Consolida regalis* consistently occurs. According to our opinion, the association *Vicetum angustifoliae-hirsutae*, which is under intensive agriculture, substitutes for the vicariants *Consolido-Brometum* and *Vicetum tetraspermae*. Probably such depauperation up to *Aperion spicae-venti* union species is also possible in the association *Aphano-Matricarietum*, since exactly this association occurs mostly in the regions where the association *Vicetum angustifoliae-hirsutae* was first described (NOWINSKI 1965).

#### **Ass. *Papaveretum dubii* Rasomavicius 1987**

Characteristic species: *Papaver dubium* and *P. argemone*.

In Lithuania, the association *Papaveretum dubii* obviously substitutes the association *Papaveretum argemonis* (Libb. 1932) Krusem. et Vlieg. 1939, which is widespread in Europe. According to the floristic composition, it most resembles the subassociation *Papaveretum argemonis delphinietosum*, in which, along with the characteristic species rather constantly and abundantly *Consolida regalis* occurs (WARCHOLINSKA 1974). However, in the Lithuanian fields, the species *Gagea pratensis*, *Holosteum umbellatum*, *Veronica hederifolia* and *V. triphyllos* do not generally occur. *Arabidopsis thaliana*, *Erophila verna*, *Myosotis micrantha* and *Myosurus minimus* are weakly associated with the described community, while in Western Europe they create a clearly marked spring aspect of the communities of the *Papaveretum argemonis* association.

In the diagnostic group of the Western European segetal association, the species *Papaver argemone* is more constant and abundant than *Papaver du-*

*bium*. The corresponding references indicate that *Papaver dubium* occurs more often in northwestern Poland (PASSARGE 1963, WOJCIK 1978, 1984). The syntaxon *Consolido-Brometum papaveretosum dubii* singled out in the Suwalki agrocommunities (in northeastern Poland), confirmed the results of the investigations (WOJCIK 1984).

Thus, the association *Papaveretum dubii* is the vicariant of the association *Papaveretum argemonis*, a peculiar floristic composition of communities is reflected by similar biotopes.

#### **Ass. *Chaenorhino-Silenetum noctiflorae* Rasomavicius 1987**

Characteristic species: *Chaenorhinum minus* and *Silene noctiflora*, the differential species: *Anagallis arvensis*.

The characteristic species of the association *Chaenorhino-Silenetum noctiflorae*, when they occur in the fields in the south of Central and Eastern Europe, belong to the alliance of the calciphilous communities *Caucalidion lappulae* R.Tx. 1950. According to TÜXEN (1950), the association *Caucalido-Scandicetum* (Libb. 1930) R.Tx. 1937 stretches to the far northwestern Europe and occurs in rendzinas of southern Poland (KORNAS 1977). Characteristic species of the association *Caucalido-Scandicetum* are *Adonis aestivalis*, *A. flammea*, *Anagallis foemina*, *Allium rotundum*, *Conringia orientalis*, *Fumaria vaillantii*, *Orlaya daucoides* (*Caucalis daucoides*), *Scandix pecten-veneris*, *Stachys arvensis*, *Vaccaria hispanica*, etc.

It must be pointed out, however, that because of a weak continental climate and/or changing edaphic conditions, thermophilous and eutrophic species decrease (i.e. *Caucalidion daucoides*) whereas acidophilous species prevail (i.e. from the alliance *Aperion spicae-venti*). These form of communities, which are impoverished but still have distinct signs of the *Caucalidion lappulae*, have the most eurytopic and eurychoric species of the alliance and usually amalgamate into separate associations, such as *Lathyro-Melandrietum* Oberd. 1957 (DUBIEL and TRZCINSKA-TACIK 1984, etc.), *Euphorbio-Melandrietum noctiflori* Müller 1964 (FIJALKOWSKI 1967). Otherwise, when species of the *Aperion spicae-venti* alliance prevail, the impoverished forms of the communities join its associations: *Aphano-Matricarietum* R.Tx. 1937 subass. *Melandrium noctiflorum*, *Vicietum tetraspermae* Krusem. et Vlieg. 1939 subass. *consolidetosum* var. *Melandrium noctiflorum* (WOJCIK 1978), *Vicietum tetraspermae aethusetosum cynapii* (WOJCIK 1975, etc.).

The *Chaenorhino-Silenetum noctiflorae* association, being weakly connected with the alliance *Caucalidion lappulae* and, on the other hand, in many char-



acteristics differing from the communities of the alliance *Aperion spicae-venti*, was suggested to ascribe to the alliance *Triticion sativae* (RASOMAVICIUS 1987b).

The calciphilous segetal communities of cereals growing in carbonic and heavy soils in regions with a cool climate belong to this alliance. *Triticion sativae* was first singled out by Dutch investigators, however, TÜXEN (1950) opposed usage of the mentioned alliance as an independent unit. Therefore, *Triticion sativae* was indicated mostly as a synonym of the alliance *Caucalidion lappulae*. The name *Triticion sativae* Krusem. et Vlieg. 1939 was used by KORNAS (1950), who pointed out the following characteristic species of this alliance: *Euphorbia exigua*, *Ranunculus arvensis* and *Sherardia arvensis*. But these characteristics were identified with the alliance *Eu-Secalion* Br.-Bl. 1936 (or alliance *Caucalidion lappulae*).

According to PASSARGE (1964), we singled out the independent alliance *Triticion sativae* beside *Caucalidion lappulae*, which could be characterized as the alliance of the thermophilous, floristically saturated segetal communities on basic argillaceous and calcareous soils. The habitat of the *Caucalidion lappulae* alliance extends outside the investigated territory.

Due to intensive agriculture, the floristic composition of weed communities has changed. Therefore, in Lithuania there are no syntaxa, distribution of which was indicated by foreign authors: *Consolido-Brometum* (discussed above) and *Scleranthetum annui baltorossicum* Prsg. 1950 (TÜXEN 1950, PASSARGE 1963). Communities of *Scleranthetum annui baltorossicum* became extinct because the agrochemical quality of cultivated fields had changed or agriculture has been discontinued in light and very poor soils.

The Lithuanian and Polish rootcrop weed communities, according to the accepted system, belong to the suborder *Polygono-Chenopodietalia* (R.Tx. et Lohm. 1950) J.Tx. 1961 and can be studied analogically.

Thus, the Lithuanian segetal communities supplement the European classification system of weed communities in cultivated fields, reflecting natural conditions and peculiarities of economic activities of most of the northeastern areas and at the presently investigated site.

## SUMMARY

The differentiation of syntaxa of cereal weed communities in Lithuania was analysed according to the floristic composition of the described communities, and compared with those in neighbouring countries. In this aspect, the characteristics of the associations singled out in Lithuania were presented: *Spergulo-Veronicetum dillenii*, *Vicetum angustifoliae-hirsutae*, *Papaveretum dubii* and *Chaenorhino-Silenetum noctiflorae* and their analogues in Poland.

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