

On the syntaxonomic position of *Plantaginetea majoris* and *Agrostietalia stoloniferae*

K syntaxonomickému postavení triedy *Plantaginetea majoris* a radu *Agrostietalia stoloniferae*

Ladislav Mucina and Ivan Jarolímek

MUCINA L. et JAROLÍMEK I. (1986): On the syntaxonomic position of *Plantaginetea majoris* and *Agrostietalia stoloniferae*. — Preslia, Praha, 58 : 349–352.

TÜXEN's (1970) synoptic table of the *Molinio-Arrhenatheretea* (*sensu lato*) was analysed by cluster analysis techniques. Unlike TÜXEN (l.c.) we are of the opinion that the *Plantaginetea majoris* should be separated from the *Molinio-Arrhenatheretea* (*sensu lato*), and that the *Plantaginetea majoris* is a well-defined class, based on TÜXEN's table which represents the West-European situation. The validity of the *Plantaginetea majoris* outside Western Europe is briefly discussed.

Dept. of Geobotany, Institute of Experimental Biology and Ecology of the S.A.S., Šteňkewiczova 1, 814 34 Bratislava, Czechoslovakia

INTRODUCTION

The *Plantaginetea majoris* R. Tx. et PREISING in R. Tx. 1950 originally comprised just one order — the *Potentillo-Polygonetalia* R. Tx. 1947 (syn. *Plantaginetalia majoris* R. Tx. (1947) 1950) which includes two alliances, the *Polygonion avicularis* BR.-BL. 1931 and the *Lolio-Potentillion anserinae* R. Tx. 1947 (syn. *Agropyro-Rumicion crispi* NORDHAGEN 1940 *sensu auct.*). Later the *Beckmannion eruciformis* Soó 1933 was added (TÜXEN 1950). In 1963 DOING referred the *Lolio-Potentillion* to a separate order, the *Festucetalia arundinaceae*. He suggested that 4 alliances, including the *Lolio-Potentillion* (still termed *Agropyro-Rumicion* by the latter author), should be classified within this order. However, the absence of a list of diagnostic species invalidates the *Festucetalia arundinaceae*. OBERDORFER et al. (1967) defied the *Agrostietalia stoloniferae*, a unit with similar contents, with a single alliance, the *Lolio-Potentillion*. The possibility of establishing a new class, the *Agrostietea stoloniferae*, was also discussed by OBERDORFER et al. (l.c.) and the class was the validly described in GÖRS (1968). TÜXEN's (1970) usage of a new name, the *Trifolio fragiferi-Agrostietalia stoloniferae* in place of the *Agrostietalia* is invalid. He classified the *Lolio-Potentillion* (*Agropyro-Rumicion*), *Trifolio-Cynodontion* and *Paspalo-Polygonion semiverticillati* within this unit and referred both the *Agrostietalia stoloniferae* and the “*Plantaginetalia*” to the *Molinio-Arrhenatheretea*. This fusion amended the *Molinio-Arrhenatheretea* because the original *Plantaginetea majoris* and the original *Molinio-Arrhenatheretea* R. Tx. 1937 were fused.

Our objections against the acceptance of this fusion are based on a revision of TÜXEN's (1970) original synoptic table. We used numerical classification techniques, using the total floristic composition, to show that the table can be interpreted in another way.

MATERIAL AND METHODS

We revised TUXEN's (1970) synoptic table to reconsider his conclusions on the syntaxonomy of the *Plantaginetea majoris* and *Agrostietalia stoloniferae*. The table includes 32 columns representing communities of 4 orders and 8 alliances. The original frequency-class values (I—V) were transformed on a scale of 1—5. The values + and r were taken for 1.

The numerical classifications using complete linkage (CLC) and sum of squares clustering (SSC; see ORLÓCI 1967, SNEATH et SOKAL 1973 for particulars on the methods) were done by the programme NCLAS of PODANI (1980). The resemblance functions used were Wishart's Similarity Ratio and non-standardized Euclidean Distance (see for instance ORLÓCI 1978, HAJDU 1981) with the CLC and SSC respectively.

RESULTS AND DISCUSSION

Both the CLC (Fig. 1) and SSC (Fig. 2) yield identical classifications. Four well distinguished clusters are produced. They correspond to the TUXEN's (1970) *Arrhenatheretalia*, *Moliniétalia*, *Plantaginétalia* and *Trifolio fragiferi-Agrostietalia stoloniferae*. The *Arrhenatheretalia* and *Moliniétalia* further

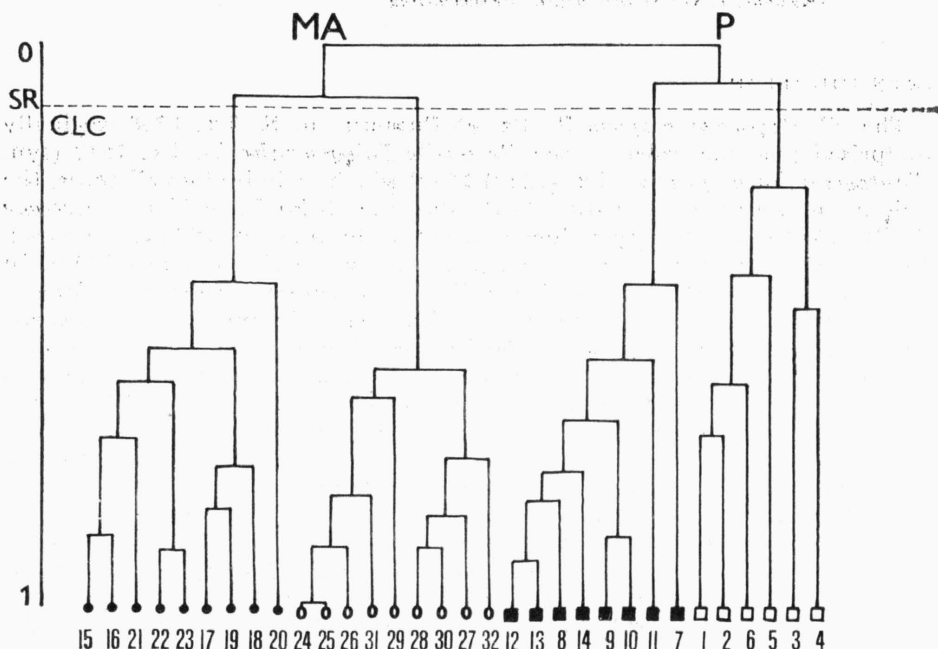


Fig. 1. — Complete linkage clustering (CLC) of TUXEN's (1970) table of the *Molinio-Arrhenatheretea sensu lato*. Legend: P — *Plantaginetea majoris*, MA — *Molinio-Arrhenatheretea sensu stricto*, shaded circles — *Arrhenatheretalia*, open circles — *Moliniétalia*, open squares — *Agrostietalia stoloniferae*, shaded squares — *Plantaginétalia*. The numbers are from TUXEN's original table. Four-cluster level is indicated by dashed line.

combine in a higher-order cluster which can be labelled *Molinio-Arrhenatheretea* R. Tx. 1937, or which TUXEN (1970) termed an "Ordnungsgruppe". The *Plantaginetalia majoris* combines with the *Agrostietalia stoloniferae* into another higher-order cluster. Thus the original contents of the *Plantaginetea majoris* are restored. The class character-species of the amended

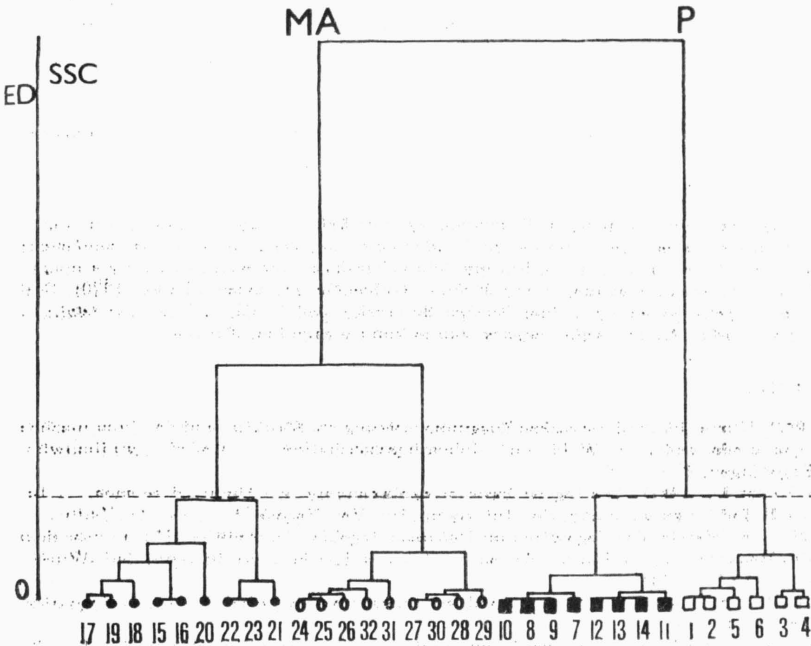


Fig. 2. Sum of squares clustering (SSC) of TUXEN's (1970) table of the *Molinio-Arrhenatheretea sensu lato*. Legend: see Fig. 1.

Molinio-Arrhenatheretea include *Trifolium repens*, *Ranunculus repens*, *Taraxacum officinale*, *Loentodon autumnalis*, *Achillea millefolium*, *Dactylis glomerata* and *Poa trivialis*. At the same time, the list of the "Ordnungsgruppenkennarten", which characterize both the *Molinietalia* and *Arrhenatheretalia*, is much longer and emphasizes the difference between both groups of orders.

In summary, we are of the opinion that the species composition and the character-species groups presented by TUXEN (1970) suggest the existence of two classes, the *Plantaginetea majoris* and *Molinio-Arrhenatheretea (sensu stricto)*, rather than one class with two groups of orders.

The presence of a group of species common to a group of classes is a more general phenomenon, observed for instance in the case of ruderal vegetation (MUCINA 1982). In some cases we could consider these species "diagnostic" of a higher-ranked syntaxon (group of classes or divisio).

The validity of the *Plantaginetea majoris* in the Atlantic domain is also advocated by SÝKORA (1983). However, the class might not hold in the Mediterranean or Submediterranean (RIVAS-MARTÍNEZ 1975) where thero-

phytes become more important in communities of trampled sites. There the difference between the *Plantaginietalia majoris* and *Agrostietalia stoloniferae* increases. In Eastern Europe the *Agrostietalia stoloniferae* shows higher similarity to the *Bidentetalia* BR.—BL. et R. Tx. 1943 and probably also *Molinietalia* than to the *Plantaginietalia majoris* as shown by MUCINA et VAN TONGEREN (1986). This observation is in accordance with the concept of geographical limitation to the validity of the syntaxonomic system (see HOLZNER 1978, FEOLI et LAUSI 1981, MUCINA 1982, 1985).

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SÚHRN

Numericko-syntaxonomická analýza Tüxenovej synoptickej tabuľky (TÜXEN 1970) triedy *Molinio-Arrhenatheretea* (sensu lato) ukázala, že *Plantaginetea majoris* a *Molinio-Arrhenatheretea* (sensu stricto) sú v podmienkach západnej Európy dobre charakterizovateľné syntaxóny a nemali by byť zlučované do široko chápanej triedy *Molinio-Arrhenatheretea* sensu Tüxen (1970). Rad *Agrostietalia stoloniferae* je vo východnej Európe floristicky podobnejší radom *Bidentetalia* a *Molinietalia* než k radu *Plantaginietalia majoris*, ako je tomu v západnej Európe.

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