Acta Bot. Croat. 48, 75—82, 1989.

CODEN: ABCRA2
YU ISSN 0365—0588

UDC 582.542.1:581.9+581.552(497.1)=20

ON THE SOCIOLOGY OF *CHRYSOPOGON GRYLLUS* IN YUGOSLAVIA

LJUDEVIT ILIJANIĆ and *JASENKA TOPIĆ*

(Department of Botany, Faculty of Science, University of Zagreb, and Faculty of Education, University of Osijek

Received September 30, 1988

According to different authors the species *Chrysopogon gryllus* has different synecologic (diagnostic) validity in dry grasslands in Yugoslavia, namely as the character species of several associations or of higher syntaxonomic units, or as the differential species or companion.

A comparative analysis of plant communities containing *Chrysopogon gryllus* in Yugoslavia shows that this plant has its sociological optimum in the communities of the order *Festucetalia valesiacae* (class *Festuco-Brometea*). Consequently, it can be designated as the character species of this order, and in other communities of the class *Festuco-Brometea* as the transgressive character species of the class.

Introduction

The species *Chrysopogon gryllus* (L.) Trin. (*Poaceae*) is considered, with regard to its distribution, as paleo-subtropical (Fournier 1961: 43), mediterranean-pontic (Horvatić 1963: 128), southeuropean-southwestasian (Ilijanić et al. 1972: 162—163) or pontic-mediterranean (Cincović and Kojić 1976: 271) floral element.

It is distributed in Yugoslavia mostly in dry grasslands in submediterranean coastal regions from Slovenia to Macedonia as well as in the eastern inland regions (Serbia), and more rarely in the western inland region in Slovenia and Croatia (cf. Schlosser and Vukotinović 1869, Soklić 1943, Mayer 1952, Kovačević and Brzac 1960, Ilijanić et al. 1972).

Recently (1989), *Chrysopogon gryllus* was found on new localities in northeastern Croatia at Bistrinci near Belišće in Podravina and sporadically in Baranja (J. Topić, B. Panjković). Also, it was found in the surroundings of Krško in Slovenia a few years ago (Lj. Ilijanić and Lj. Marković). These finds, not yet published, complete to a certain extent the picture of the distribution of *Chrysopogon gryllus* in Croatia and Slovenia.

As this plant is the dominant species in many plant communities and its synecologic (sociologic) amplitude is wide (cf. e.g. Koch 1943, Kojić 1954, 1957, 1959, Horvatić 1963, Lorenzoni 1965, Csürös and Niedermaier 1966, Antonietti 1970. Loisel 1970, Aubert and Loisel 1971, Ilijanić et al. 1972, Micevski 1972, 1973, 1977, Meyer 1976 a.o.) different authors give it rather different diagnostic validity (sociologic status).

On the basis of synecological data from Yugoslavia, we wanted to establish the location of its ecologic (sociologic) optimum and its diagnostic (syntaxonomic) significance in the grassland communities containing *Chrysopogon gryllus* in Yugoslavia.

Methods

To determine the sociological amplitude of *Chrysopogon gryllus* and communities with the optimum of its distribution in Yugoslavia, we made a comparative constancy table. The communities with *Chrysopogon gryllus* described by different authors have been taken into consideration for the table.

The upper part of the Table shows full names of vegetation classes, orders and alliances (according to the authors of these syntaxonomic units). As there are numerous associations, they are marked only by number in the upper part of the Table. Their full names, authors and the area where they have been investigated are entered in the lower part of the Table. Also, authors of papers taken from the data in the Table are given, as well as the syntaxonomic status (diagnostic validity) of *Chrysopogon gryllus* as determined by the authors of cited papers (Table 1).

Results and Discussion

As shown in Table 1 the species *Chrysopogon gryllus* is present in numerous grassland communities in Yugoslavia. From the syntaxonomic standpoint these communities belong to different higher vegetation units (alliances, orders and classes).

Different authors have given the species *Chrysopogon gryllus* various syntaxonomic status (diagnostic validity). Horvatić (1963) included it in the associations of the submediterranean order *Scorzonero-Chrysopogonetalia* as the character species of this order (Table 1, ass. no. 1—4 and 6—8), also did Šegulja (1969) in the association *Narcisso-Asphodeletum microcarpi* (Table 1, no 5) and Ilijanić (1970) as a common plant of the alliance (*Scorzonerion villosae*) and order (Table 1, no. 9).

Table 1.

CLASS	*BRACHYPODIO-CHRYSOPOGONETEA* H-ić (1956) 1958																								
ORDER	*SCORZONERO-CHRYSOPOGONETALIA* H-ić et Ht (1956) 1958									*CYMBOPOGO-BRACHYPODIETALIA* H-ić 1958	*ASTRAGALO-POTENTILLETALIA* Micev. 1970								*FESTUC*						
ALLIANCE	*CHRYSOPOGONO-SATUREION* Ht. et H-ić 1934					*SCORZONERION VILLOSAE* H-ić 1949				*VULPIO-LOTION* H-ić 1960	*TRIFOLION CHERLERI* Micev. 1970				*SCABIOSO-TRIFOLION DALMATICI* H-ić et Rand. 1973		*SATUREIO-THYMION* Micev. 1970	*KOELERIO-FESTUCION* Ruž. et Rand. 1982	*CHRYSOPOGONO-DANTHONION CALYC*						
ASSOCIATION*	1	2	3	4	5	6	7	8	9	10	11a	11b	12a	12b	13	14	15	16	17a	17b	17c	17d	17e	18a	18b
NUMBER OF RELEVÉS	12	4	16	12	8	17 + 5	20	22	1	9	32	53	29	22	10	21	44	11	35	—	23	10	15	17	14
CONSTANCY and C.-A. DEGREE of *CHRYSOPOGON*	I^2	1^+	V^{2-3}	V^3	V^{1-2}	$IV + V^{2-3}$	V^3	IV^{2-3}	1^+	V^3	I^{+-2}	III^{+-4}	IV^{+-4}	V^{1-4}	V^{+-3}	IV^{+-3}	II^{+-2}	I^+	V^{3-5}	V^{3-5}	V^{+-5}	V^{2-4}	V^{2-4}	V^{3-5}	V^{1-5}
DIAGNOSTIC VALIDITY OF *CHRYSOPOGON GRYLLUS*	Char. O.	Char. O.	Char. O.	Char. O.	Char. O.	Char. O.	Char. O.	Char. O.	Char. All. et. O.	Transgr. Cl.	Char. Cl.	Char. Cl.	Char. Cl.	Diff. Subass.	Char. Cl.	Char. Cl.	Char. Cl. (see text)	Char. Cl.	Char. O. + Cl.		Char. Ass.	Comp.	Domin.	Char. O. + Cl.	Char. Cl.

*1. *Stipo-Salvietum officinalis* H-ić (1956) 1958 — Croat. (Medit.) (Horvatić 1963)
2. *Helichryso-Armerietum dalmaticae* H-ić 1963 — Croat. (Medit.) (Horvatić 1963)
3. *Festuco-Koelerietum splendentis* H-ić 1963 — Croat. (Medit.) (Horvatić 1963)
4. *Asphodelo-Chrysopogonetum grylli* H-ić (1956) 1958 — Croat. (Medit.) (Horvatić 1963)
5. *Narcisso-Asphodeletum microcarpi* Šeg. 1969 — Croat. (Medit.) (Šegulja 1969)
6. *Ononido-Brometum condensati* H-ić (1956) 1958 — Croat. (Medit.) (Horvatić 1963)
7. *Chrysopogono-Euphorbietum nicaeensis* H-ić (1956) 1958 — Croat. (Medit.) (Horvatić 1963)
8. *Danthonio-Scorzoneretum villosae* H-ić (956) 1958 — Croat. (Medit.) (Horvatić 1963)
9. *Andropogono-Diplachnetum serotinae* H-ić 1963 — Croat. (Medit.) (Ilijanić 1970)
10. *Chrysopogono-Airetum capillaris* H-ić (1956) 1958 — Croat. (Medit.) (Horvatić 1963)
11a. *Erysimo-Trifolietum onobrychietosum* Micev. 1977 — Macedonia (Micevski 1977)
11b. *Erysimo-Trifolietum* Micev. 1977 — Macedonia (Micevski 1977)
12a. *Helianthemo-Euphorbietum thessalae* Micev. 1973 — Macedonia (Micevski 1973)
12b. *H.-E. th. chrysopogonetosum* Micev. 1978 — Macedonia (Micevski 1978)
13. *Trifolio-Lotetum angustissimi* H-ić et Rand. 1973 — Serbia (Ranđelović 1978)
14. *Astragalo-Calaminthetum alpinae* H-ić et Rand. 1973 — Serbia (Ranđelović 1978)
15. *Brachypodio-Onobrychietum pindicolae* Micev. 1971 — Macedonia (Micevski 1971)
16. *Festuco-Plantaginetum serpentini* Ruž. et Rand. 1982 — Serbia (Ranđelović, Ružić 1983)
17a. *Agrostio-Chrysopogonetum grylli* Kojić 1959 — Serbia (Kojić 1959)
17b. *Agr.-Chr. grylli* Kojić 1959 — Serbia (Jovanović-Dunjić et. al. 1986)
17c. *Agr.-Chr. grylli* Kojić 1959 — Serbia (Gajić 1961)
17d. *Agr.-Chr. grylli* Kojić 1959 — Serbia (Tatić 1969)
17e. *Agr-Chr. grylli* Kojić 1959 — Serbia (Diklić, Nikolić 1972)
18a. *Trifolio-Trisetetum flavescentis* Rand. 1975 — Serbia (Ranđelović 1975)
18b. *Festuco-Chrysopogonetum grylli* Rand. (1975) 1977 (=*Trifolio-Trisetetum flavescentis* Rand. 1975) — Serbia (Ružić 1983)

19. *Chrysopogonetum grylli* Vučković 1983 — Vojvod. (Serbia) (Vučković 1983)
20. *Teucrio-Chrysopogonetum grylli* R. Jov. 1954 — Serbia (Horv. Glav. Ellenb. 1974)
21. *Trifolio-Chrysopogonetum grylli* Veljović 1967 — Serbia (Veljović 1967)
22. *Bromo (squarosi)-Chrysopogonetum grylli* Kojić 1959 — Serbia (Kojić 1959)
23. *Chrysopogono-Festucetum valesiacae* Veljović 1971 — Serbia (Veljović 1971)
24. *Chrysopogonetum pannonicum* Stjep.-Vesel. 1953 — Vojvod. (Serbia) (Horv. Glav. Ellenb. 1974)
25. *Thymo-Chrysopogonetum grylli* S. Stojanović 1983 — Vojvod. (Serbia) (Stojanović 1983)
26. *Chamaecytiso austriacae-Chrysopogonetum* Butorac 1989 — Vojvod. (Serbia) (Butorac 1989)
27. *Centaureo sadlerianae-Chrysopogonetum* Parab. et Stoj. 1985 — Vojvod. (Serbia) (Parabućski, Stojanović 1985)
28. *Trifolio campestre-Chrysopogonetum grylli* Butorac 1989 — Vojvod. (Serbia) (Butorac 1989)
Festuco-Potentilletum arenariae Stjep.-Vesel. 1953 — Vojvod. (Serbia) (Horv. Glav. Ellenb. 1974)
Inulo-Chrysopogonetum grylli V. Stev. 1984 — Vojvod. (Serbia) (Stevanović 1984)
Botriochloo-Euphorbietum glareosae chrysopogonetosum grylli V. Stev. 1984 — Vojvod. (Serbia) (Stevanović 1984)
Koelerio-Festucetum wagneri Stjep.-Vesel. 1953 — Vojvod. (Serbia) (Horv. Glav. Ellenb. 1974)
Taraxaco serotini-Festucetum valesiacae S. Stojanović 1983 — Vojvod. (Serbia) (Stojanović 1983)
Crambo-Artemisietum campestris V. Stevanović 1984 — Vojvod. (Serbia) (Stevanović 1984)
35. *Agropyro-Kochietum prostratae* Zolyomi 1958 — Vojvod. (Serbia) (Stojanović 1983)
36. *Globulario-Chrysopogonetum grylli* Ilijanić et al. 1972 — W. Croatia (Ilijanić et al. 1972)
37. *Festucetum vaginatae deliblaticum* Stjep.-Vesel. 1953 — Vojvod. (Serbia) (Horv. Glav. Ellenb. 1974)
38. *Corynephoro-Festucetum vaginatae croaticum* Soklić 1943 — N. Croatia (Soklić 1943)
39. *Genisto-Callunetum* Ht. 1931 *chrysopogonetosum* Ilijanić et al. 1972 — W. Croatia (Ilijanić et al. 1972)

CO-BROMETEA Br.-Bl. et Tx. 1943																		*FESTUCE-TEA VAGIN.* Soó 1968 em. Vicher. 1972		*NARDO-CALLU-NETEA* Preis. 1944	
FESTUCETALIA VALESIACAE Br.-Bl. et Tx. 1943																*BROME-TALIA* Br.-Bl. 1936		*FESTUCE-TALIA VAGIN.* Soó 1929		*CALLUNO-ULI-CETALIA* (Quant) Tx. 1933	
CINAE Kojić 1957			*FESTU-CION VA-LESIACAE* Klika 1931		*FESTUCION RUPICOLAE* Soó 1940 (= *F. sulcatae*)											*ARTE-MISIO-KOCHION* Soó 1959	*BROMION ERECTI* Br.-Bl. 1936	*FESTUCI-ON VAGI-NATAE* Soó 1929		*CALLUNO-FEST. CAPILLATAE* Ht. 1959	
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	
15	10	23	15	5	25	30	20	15	17	25	20	15	20	20	10	15	4	40	38	4	
V^{1-3}	V	V^{2-4}	V^{2-4}	V^{3-5}	V^{1-4}	V^{+-4}	V^{1-4}	V^{+-3}	V^{+-3}	IV^{1-3}	V^{+-4}	V^{2-4}	III^{+-2}	II^{+-1}	II^{+}	I^{+-1}	4^{3-4}	I^{+}	I^{+}	4^{3}	
Char. O.	Char. O. + Cl.	Char. Ass.	Char. Ass.	Char. Ass.	Char. O. + Cl.	Char. O.	Char. Ass.	Char. O.	Char. Ass.	Char. O. + Cl.	Char. comb.	Diff. Subass.	Char. O. + Cl.	Char. O.	Char. O.	Char. O.	Domin.	Char. O. + Cl.	Accid.	Domin.	

Legend:

Char. Ass. — Character species of association
Char. All. — Character species of alliance
Char. O. — Character species of order
Char. Cl. — Character species of class
Transgr. Cl. — Transgressive character species of class
Diff. Subass. — Differential species of subassociation
Domin. — Dominant species
Comp. — Companion species
Accid. — Accidental species
Char. comb. — Characteristic combinations of species
C.-A. degree — Cover-abundance degree
Croat. — Croatia
Medit. — Mediterranean region (s. l.)
Vojvod. — Vojvodina

Chrysopogon gryllus was designated by Horvatić (1963) as the transgressive character species of the class *Brachypodio-Chrysopogonetea* in the association *Chrysopogono-Airetum capillaris* (Table 1, no. 10).

In Macedonia (and some southern parts of Serbia) *Chrysopogon gryllus* is mainly distributed in the communities of the east-submediterranean order *Astragalo-Potentilletalia* Micev. (Table 1, no 11 a — 16). Still undecided to which class to assign the order *Astragalo-Potentilletalia,* in his description of the association *Brachypodio-Onobrychietum pindicolae* (Micevski 1971) and *Helianthemo-Euphorbietum thessalae,* Micevski (1973) indicated *Chrysopogon gryllus* among common species of the classes *Brachypodio-Chrysopogonetea, Thero-Brachypodietea* and *Festuco-Brometea* (Table 1, no. 12a and 15). In the subassociation *Helianthemo-Euphorbietum thessalae chrysopogonetosum* (Table 1, no. 12b) Micevski (1978) counted it as a differential species of this subassociation.

After being included the order *Astragalo-Potentilletalia* in the class *Festuco-Brometea, Chrysopogon gryllus* was designated (in the communities of this order) as the character species of the class (Micevski 1977, also Randelović 1978, Randelović and Ružić 1983).

Some authors (cf. Kojić 1959, Horvat, Glavač, Ellenberg 1974, Randelović 1975) put it in the group of common character species of the order (*Festucetalia valesiacae*) and the class (*Festuco-Brometea,* Table 1, no. 17a, 18a, 20, 24, 29, 32) or as the character species of the class *Festuco-Brometea* (Table 1, no. 18b, Ružić 1983). Other authors (Vučković 1983, Stojanović 1983, Stevanović 1984, Parabučski and Stojanović 1985) designate it as the character species of the order *Festucetalia valesiacae* (Table 1, no. 19, 25, 27, 33, 34. 35).

Within the same order (*Festucetalia*), some authors (Kojić 1959, Gajić 1961, Veljović 1967, 1971, Butorac 1989) take *Chrysopogon gryllus* as the character species of various associations (Table 1, no. 17c, 21, 22, 23, 26, 28).

Chrysopogon gryllus is less constant in the communities of the order *Festucetalia vaginatae.* Horvat, Glavač, Ellenberg (1974) included it in the association *Alysso-Festucetum vaginatae* Stjep.-Vesel. (= *Festucetum vaginatae deliblaticum* Stjep.-Vesel.) in the group of common character species of the order *Festucetalia vaginatae* and of the class *Festucetea vaginatae* (Table 1, no. 37).

This plant species was noticed in some communities (Table 1, no. 17e, 36, 39) also as the dominant species (Diklić and Nikolić 1972, Ilijanić et al. 1972), or companion (Table 1, no. 17d, Tatić 1969) and accidental species (Table 1, no. 38, cf. Soklić 1943) too. It was noted in a few other communities syntaxonomicaly not classified by cited authors (cf. Kojić and Ivanović 1953, Gajić 1952, Stjepanović-Veselčić 1953, Kovačević and Brzac 1960). Those have not been taken into consideration for our Table.

A comparative analysis of the grassland communities mentioned (Table 1) shows that the species *Chrysopogon gryllus* is chiefly present in communities of the class *Festuco-Brometea,* and its ecologic (sociologic) optimum is in the associations of the eastcontinental order *Festucetalia valesiacae.* As a transgresive species of the class *Festuco-Brometea* it has an important role in some communities of the orders *Scorzonero-Chrysopogonetalia* H-ić and *Astragalo-Potentilletalia* Micev. too, showing (with other common species of the same ecologic feature) the synecologic and phytogeographic relationship of the three orders mentioned.

Therefore we consider it more naturally as the order *Scorzonero-Chrysopogonetalia* H-ić (or at least the majoriti of associations of this order) subordinate to the class *Festuco-Brometea*, and no to the class *Brachypodio-Chrysopogonetea* H-ić where it was subordinated previously. Within the class *Brachypodio-Chrysopogonetea* Horvatić (1958, 1963) united submediterranean and mediterranean-montane grassland communities of the order *Scorzonero-Chrysopogonetalia* with analogous eumediterranean grassland vegetation of the order *Cymbopogo-Brachypodietalia*. Later, he realized that this solution was not quite accurate and he revised his earlier standpoint (Horvatić 1973, 1975). It seems, however, that the new division was not made quite consistently either.

With regard to the order *Astragalo-Potentilletalia* Micev., the earlier hesitation concerning its syntaxonomical position (cf. Micevski 1970), was resolved by the author (Micevski) himself. He included this order, accurately on our opinion, in the class *Festuco-Brometea* (cf. Micevski 1973, 1977).

The species *Chrysopogon gryllus*, with regard to its sociological (synecological) optimum, could be designated, on the basis of the present analysis, as the character species of the order *Festucetalia valesiacae*, while in the communities of the orders *Scorzonero-Chrysopogonetalia* H-ić and *Astragalo-Potentilletalia* Micev. it has diagnostic validity as the transgressive character species of the class *Festuco-Brometea*.

The question arises whether all plant communities of the class *Festuco-Brometea* where the species *Chrysopogon gryllus* (with other plants of the same sociologic feature) has a significant role, could be united as a distinct synecologic unit (subclass within *Festuco-Brometea*, or perhaps, as a distinct class?).

A certain answer to this question would require a much more detailed comparative synecological analysis of all *Festuco-Brometea* and related plant communities. However, this exceeds the frame of our paper.

References

Antonietti, A., 1970: Su un'associazione di brughiera del piede meridionale delle Alpi. Ber. Geobot. Inst. ETH, Stiftung Rübel, Zürich *40*, 9—27.

Aubert, G., R. Loisel, 1971: Contribution à l'étude des groupments des *Isoëto-Nanojuncetea* et des *Helianthemetea annua* dans le sud-est méditerranéen français. Ann. Univ. Province *45*, 203—241.

Butorac, B., 1989: Vegetacija Sremskog lesnog platoa. Doktorska disertacija. Prirodno-matematički fakultet Univ. Novi. Sad.

Cincović, T., M. Kojić, 1976: *Chrysopogon* Trin. In: Josifović, M. (edit) Flora SR Srbije VIII: 270—271. Srpska akad. nauka i umet. Beograd.

Bogojević, R., 1968: Floristička i fitocenološka ispitivanja vegetacije na Višnjičkoj kosi kraj Beograda. Glasn. Bot. zav. i bašte Univ. Beograd *3* (1—4), (1965—1966), 79—99.

Csürös, St., K. Niedermaier, 1966: Phytozönologische Untersuchungen über die *Chrysopogon-Gesellschaften* des Tirnavahochlandes (R. S. Rumenien). Vegetatio *13* (6), 302—318.

Diklić, N., V. Nikolić, 1972: O nekim livadskim zajednicama iz Đerdapske klisure. Glasn. Prirodnjač. muzeja (Beograd) ser. B. *27*, 201—212.

Fournier, P., 1961: Les quatre flores de la Françe. Edit. Paul Lechevalier, Paris.

Gajić, M., 1952: O vegetaciji Košutnjaka (De la vegetation de Košutnjak) Glasn. Šum. fak. (Beograd) *5*, 283—308.

Gajić, M., 1961: Fitocenoze i staništa planine Rudnik i njihove degradacione faze (Phytocenosen und Standorte des Gebirges Rudnik und ihre Degradationsphasen). Doktorska disertacija. Glasn. Šum. fak. (Beograd) *23*, 3—114.

Horvat, I., V. Glavač, H. Ellenberg, 1974: Vegetation Südosteuropas. Geobot. selecta Bd. IV, Gustav Fischer Verl. Stuttgart.

Horvatić, S., 1958: Geographisch-typologische Gliederung der Niederungs--Wiesen und -Weiden Kroatiens. Angew. Pflanzensoz. (Stolzenau) Weser *15*, 63—73.

Horvatić, S., 1963: Vegetacijska karta otoka Paga s općim pregledom vegetacijskih jedinica Hrvatskog primorja. Prirodoslov. istraživ. Jugoslav. akad. znan. umjetn. (Zagreb) *33*, Acta biol. 4.

Horvatić, S., 1973: Syntaxonomic analysis of the vegetation of dry grassland and stony meadows in eastern Adriatic coastal karst district based on the latest phytocoenological research. Fragmenta herbologica Jugoslavica *32*, 1—15.

Horvatić, S., 1975: Neuer Beitrag zur Kenntnis der Syntaxonomie der Trocken--Rasen- und Steintriften-Gesellschaften des ostadriatischen Karstgebietes. Problems of Balkan flora and vegetation. Proceedings of the first international symposium on Balkan flora and vegetation, Varna, June 7—14, 1973, 300—310, Sofia.

Ilijanić, Lj., 1970: Expositionsbedingte ökologische Unterschiede in der Pflanzendecke der Sonn- und Schattenhänge am Lim-Kanal (Istrien). Vegetatio (The Hague) *21* (1—3), 1—27.

Ilijanić, Lj., V. Gaži, J. Topić, 1972: Grasslands containig *Chrysopogon gryllus* in continental regions of West Croatia. Acta Bot. Croat. *31*, 155—164.

Jovanović-Dunjić, R., 1954: O fitocenozi đipovine u istočnoj Srbiji. (Über die Phytozönose des Goldbartes (*Chrysopogon gryllus*) in Ostserbien). Zborn. rad. Inst. ekol. biogeogr. SAN (Beograd) *5*, 1—18.

Jovanović-Dunjić, R., K. Stefanović, R. Popović, J. Dimitrijević, 1986: Prilog poznavanju livadskih ekosistema na području Velikog Jastrebca. Glasn. Inst. bot. i botan. bašte Univ. Beograd *20*, 7—31.

Koch, W., 1943: Das *Andropogonetum grylli insubricum*, eine Trockenwiesen--Assoziation des Südtessins. Ber. Schweiz. Bot. Ges. *53*, A, 579—594.

Kojić, M., 1959: Zastupljenost, uloga i značaj đipovine (*Chrysopogon gryllus* Trin.) u livadskim fitocenozama Zapadne Srbije (Vertretung, Rolle und Bedeutung des Goldbartes (*Chrysopogon gryllus* Trin.) in den Wiesenphytocoenosen Westserbiens). Arhiv poljopriv. nauke (Beograd) *12*, (37), 3—46.

Kojić, M., 1957: *Chrysopogono-Danthonion calycinae* — nova sveza iz reda *Festucetalia vallesiacae* Br.-Bl. et Tx. Zborn. rad. Poljopriv. fak. (Zemun) *5* (2), 51—55.

Kojić, M., M., Ivanović, 1953: Fitocenološka istraživanja livada na južnim padinama Maljena (Phytocenologic investigations of meadows on the southern slopes of the Maljen Mountain). Zborn. rad. Poljopriv. fak. (Beograd) *1* (1), 1—18.

Kovačević, J., T. Brzac, 1960: Zwei neue Standorte *Chrysopogon gryllus* Trin. in Nordwest-Kroatien. Fragmenta Balcanica Mus. Maced. scient. nat. *3* (14), 113—115.

Loisel, R., 1970: Contribution à l'étude des pelouses à Andropogonées du littoral provençal. Ann. Fac. Sci. Marseille *43* B, 197—213.

Mayer, E., 1952: Seznam praprotnic in cvetnic slovenskega ozemlja (Verzeichnis der Farn- und Blütenpflanzen des slowenischen Gebietes). Slov. akad. znan. umetn. Razr. prir. in medic. vede, Dela *5*, Inst. biol. 3, Ljubljana.

Meyer, M., 1976: Pflanzensoziologische und ökologische Untersuchungen an insubrischen Trockenwiesen karbonathaltiger Standorte. Veröff. Geobot. Inst. ETH, Stiftung Rübel, Zürich *57*, 1—145.

Micevski, K., 1970: *Astragalo-Potentilletalia*, nov vegetaciski red na brdskite pasišta vo Makedonija (*Astragalo-Potentilletalia*, eine neue Vegetationsordnung der Bergweiden Mazedoniens). Maked. akad. nauk. umetn. Oddel prir.-matem. nauki (Skopje), Prilozi *11* (2), 15—23.

Micevski, K., 1971: »Stepska« vegetacija vo Makedonija (»Steppenvegetation« in Mazedonien). God. zborn. Prir.-mat. fak. Univ. Skopje *23* (1970), 131—150.

Micevski, K., 1972: *Tunico-Trisetetum myrianthi* Micev. ass. nov. vo vegetacijata na brdskite pasišta vo Makedonija (*Tunico-Trisetetum myrianthi* Micev. ass. nov. in der Bergweiden-Vegetation von Mazedonien). God. zborn. Prir.-mat. fak. Univ. Skopje *24* (1971), 60—65.

Micevski, K., 1973: *Helianthemo-Euphorbietum thessalae* Micev. ass. nov. vo vegetacijata na brdskite pasišta vo Makedonija (*Helianthemo-Euphorbietum thessalae* Micev. ass. nov. in der Vegetation der Bergweiden von Mazedonien). God. zborn. Prir.-mat. fak. Univ. Skopje *25* (1972), 149—155.

Micevski, K., 1977: *Erysimo-Trifolietum* Micev. ass. nov. vo vegetacijata na Makedonija. Maked. akad. nauk. umetn. (Skopje), Prilozi *9* (1), 75—82.

Micevski, K., 1978: Tipološki ispituvanja na vegetacijata na livadite i pasišta vo Maleš i Pijanec (Typologische Untersuchungen der Wiesen- und Weiden-Vegetation der Gebiete Maleš und Pijanec). Maked. akad. nauk. umetn. (Skopje), Maleš i Pijanec I, 9—41.

Parabućski, S., S. Stojanović, 1985: Prilog poznavanju stepske vegetacije južnog oboda Panonske nizije (Contribution to the study of steppe vegetation of south border of Panonian plain). Bilten Društva ekol. Bosne i Hercegov. Ser. B, 4, III Kongres ekol. Jugoslav. Knj. *3*, 123—131, Sarajevo.

Petkovšek, V., 1970: Mezobrometalne in sorodne travne združbe na prehodu med predalpskim, dinarskim in submediteranskim območjem v Sloveniji. Biološki vestn. (Ljubljana) *18*, 3—12.

Ranđelović, N., 1975: *Trifolio-Trisetetum flavescentis* Randđ. 1974., ass. nov. iz sveze *Chrysopogono-Danthonion calycinae* Kojić 1957 (*Trifolio-Trisetetum flavescentis* Randđ. Ass. nov. aus dem Verband *Chrysopogono-Danthonion calycinae* Kojić 1957). Glasn. Prirodnj. muz. (Beograd) Ser. B, *30*, 167—169.

Ranđelović, N., 1978: Fitocenološko-ekološke karakteristike brdskih travnjaka jugoistočne Srbije. Doktorska disertacija. Prir. Mat. fak. Sveučilišta u Zagrebu, 143 str.

Ranđelović, N., M. Ružić, 1983: Pašnjačka serpentinska vegetacija jugoistočne Srbije. Glasn. Prirodnj. muz. (Beograd) Ser. B, *38*, 55—61.

Ružić, M., 1983: Asocijacija *Festuco-Chrysopogonetum grylli* Randđ. 74 na planini Vidojevici kod Prokuplja. Glasn. Prirodnj. muz. (Beograd) Ser. B, *38*, 47—54.

Stevanović, V., 1984: Ekologija, fitocenologija i floristička struktura stepske vegetacije Fruške gore. Doktorska disertacija, Prir.-mat. fak. Univ. Beograd.

Soklić, I., 1943: Biljni sviet podravskih piesaka (Die Pflanzenwelt des Sandbodengebietes »Podravski piesci« in Kroatien). Hrv. šum. list (Zagreb) *67*, 2—34.

Stjepanović-Veselčić, L., 1953: Vegetacija Deliblatske peščare. Posebna izd. Srpske akad. nauka knj. 216, Inst. ekol. biogeogr. (Beograd), knj. 4.

Stjepanović-Veselčić, L., 1956: Psamofitska vegetacija živih peskova Srbije (Psammphyten-Vegetation auf Flugsandboden Serbiens). Zborn. rad. Inst. ekol. biogeogr. (Beograd) *7* (2), 1—27.

Stojanović, S., 1983: Vegetacija Titelskog brega (Vegetation of the Titel Hill). Zborn. prir. nauke Matice srpske (Novi Sad) *65*, 5—51.

Šegulja, N., 1969: Prilog poznavanju kamenjarske vegetacije u Istri. Acta Bot. Croat. *28*, 367—371.

Tatić, B., 1969: Flora i vegetacija Studene planine kod Kraljeva. Glasn. Bot. zav. i bašte Univ. Beograd 4 (1—4) (1967—1968), 27—72.

Veljović, M., 1967: Vegetacija okoline Kragujevca. Glasn. Prirodnj. muz. (Beograd), Ser. B, *22*, 1—108.

Veljović, V., 1971: Vegetacija Golog brda. Glasn. Prirodnj. muz. (Beograd), Ser. B, *26*, 115—123.

Vučković, M., 1986: *Chrysopogonetum grylli* prov. na pobrđu Vršačkih planina. Zborn. rad. naučnog skupa »Čovek i biljka« Novi Sad, 21—22. septembra 1983, pp. 419—429.

SAŽETAK

FITOCENOLOŠKI ODNOSI VRSTE *CHRYSOPOGON GRYLLUS* U JUGOSLAVIJI

Ljudevit Ilijanić i *Jasenka Topić*

(Botanički zavod Prirodoslovno-matematičkog fakulteta Sveučilišta u Zagrebu i Pedagoški fakultet Sveučilišta u Osijeku)

Pontsko-mediteranska (južnoevropsko-zapadnoazijska) vrsta *Chrysopogon gryllus* rasprostranjena je na području Jugoslavije u prvom redu kao element suhih submediteranskih i istočnokontinentalnih travnjaka. Rjeđe je rasprostranjena u travnjačkoj vegetaciji izvanmediteranskih zapadnih područja naše zemlje.

S obzirom na razmjerno široku fiteocenološko-ekološku amplitudu, razni autori pridaju toj biljci različito sintaksonomsko dijagnostičko značenje. Jedni je smatraju karakterističnom vrstom pojedinih asocijacija, dok je drugi označavaju karakterističnom vrstom viših vegetacijskih jedinica, dominatnom vrstom ili pratilicom (usp. engleski tekst i tab. 1).

Komparativna analiza zajednica s *Chrysopogon gryllus* (tab. 1) pokazuje da je ta vrsta u našoj zemlji nazočna pretežno u zajednicama razreda *Festuco-Brometea* s optimumom u fitocenozama istočnokontinentalnog reda *Festucetalia valesiacae* Br.-Bl. et Tx., a veliko značenje ima i u različitim asocijacijama submediteranskih redova *Scorzonero-Chrysopogonetalia* Hić *i Astragalo-Potentilletalia* Micev., pa (uz ostale ekološki slične biljke indicira fitocenološko-ekološku i fitogeografsku srodnost zajednica triju navedenih vegetacijskih redova.

Stoga smo mišljenja da red *Scorzonero-Chrysopogonetalia* H-ić (1956) 1958 (barem najvećim dijelom) prirodnije pripada razredu *Festuco-Brometea* Br.-Bl. et Tx. nego razredu *Brachypodio-Chrysoponetea* H-ić. kako ga je prvobitno shvatio Horvatić (1958, 1963), ujedinivši submediteranske i eumediteranske suhe travnjake u zajednički razred. Kasnije je i sam uvidio da to rješenje nije dobro, pa je revidirao svoje ranije gledište i dio zajednica reda *Scorzonero-Chrysopogonetalia* kao novi red *Scorzoneretalia villosae* podredio razredu *Festuco-Brometea* (Horvatić 1973, 1975). Daljnja komparativna fitocenološka i ekološka istraživanja pokazat će je li novo rješenje, kako ga je predložio Horvatić, u cijelosti prihvatljivo. Čini nam se da nije dovoljno dosljedno provedeno.

Što se tiče reda *Astragalo-Potentilletalia* Micev. 1970. prvobitne nedoumice u pogledu njegova sintaksonomskog položaja (Micevski 1970), autor je naknadno, po našem mišljenju pravilno, riješio tako da je taj red jednoznačno priključio razredu *Festuco-Brometea* (Micevski 1973, 1977).

Na temelju ovdje prikazane komparativne fitocenološke analize može se *Chrysopogon gryllus* po našem mišljenju označiti karakterističnom vrreda *Festucetalia valesiacae,* dok u zajednicama redova *Scorzonero-Chrysopogonetalia* i *Astragalo-Potentilletalia* predstavlja transgresivnu karakterističnu vrstu razreda *Festuco-Brometea.* Mjestimično, u pojedinim područjima, ulazi ona i u sastav nekih zajednica drugih vegetacijskih razreda, često kao dominantna pratilica, odnosno diferencijalna vrsta koja indicira fitogeografske i sinekološke veze sa zajednicama razreda *Festuco-Brometea.*

Nameće se pitanje, ne bi li zajednice razreda *Festuco-Brometea* u kojima značajnu ulogu ima vrsta *Chrysopogon gryllus* (uz druge vrste sličnih fitocenoloških odnosno ekoloških karakteristika) trebalo izdvojiti kao zasebnu skupinu fitocenoza (podrazred u okviru *Festuco-Brometea* ili možda čak zaseban razred?).

Za sigurniji odgovor na to pitanje potrebna je, dakako, mnogo detaljnija i opsežnija fitocenološka komparativna analiza razreda *Festuco-Brometea* kao i srodnih zajednica u cijelom arealu. Međutim, takva analiza prelazi okvire ovoga priloga.

Prof. dr. Ljudevit Ilijanić
Botanički zavod Prirodoslovno-matematičkog
fakulteta Sveučilišta u Zagrebu
Maruličev trg 20/II
YU-41000 Zagreb (Jugoslavija)

Doc. dr. Jasenka Topić
Pedagoški fakultet Sveučilišta u Osijeku
Jože Vlahovića 9
YU-54000 Osijek (Jugoslavija)