ECOLOGIA BALKANICA
2022, Vol. 14, Issue 1 June 2022 pp. 125-135

Grassland Habitats of Community Importance on the Territory of Godech Municipality, West Bulgaria

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Abstract. The investigated territory is located in the Western part of Bulgaria. The aim of the presented research is to reveal the diversity of grassland habitats in Godech Municipality. Following the Braun-Blanquet approach, 418 relevés were collected during the 2019-2020 field seasons and the grassland habitats were verified at 3422 field points, as well. The latter represent terrain samplings that prove or disprove preliminary habitat interpretation. The following habitat types (eight in total): 6210, 6230, 62A0, 62D0, 6410, 6430, 6510 and 6520 were found on field, according to Directive 92/43/EEC. The main threats are modification of the habitats into shrublands and the invasion of plants species. Some of the habitats are being ploughed and turned into agricultural areas. The results obtained may be used as a basis for a territorial expansion of the study in the neighboring municipalities.

Key words: vegetation, NATURA 2000, GIS, mapping.

Introduction

Habitat identification is a matter of a wide present interest among scientists and environmentalists. The conservation of natural habitats of Community importance is an essential part of Council Directive 92/43/EEC of the European Union.

According to the official national sources (EEA, 2021) over 30% of the investigated area is covered by habitats, which are a part of two Sites of Community Interest: the smaller one is Dragoman (BG0000322), located to the south and the bigger one is Western Balkan Range and Forebalkan (BG0001040). The authors expect that this percent will prove out to be even bigger.

Grassland vegetation in different areas of Godech Municipality was investigated by a number of authors. Iordanov (1924) focuses his study on the phytogeography of Western Stara Planina Mountain, while Tashev et al. (2010) contributed with a study, regarding the habitat diversity in the mountain. Pedashenko et al. (2010) studied the local occurrence of *Artemisia*

chamaemelifolia Vill. Velev et al. (2011 a, b) published two research papers focused on the investigation of *Cynosurus cristatus* grasslands and alliance *Arrhenatherion elatioris* in West Bulgaria. Vassilev et al. (2011) studied the effect of land abandonment on the vegetation of upland semi-natural grasslands. Vassilev et al. (2012a) studied the class *Festuco–Brometea* with an emphasis on alliance *Cirsio–Brachypodion pinnati*. Velev & Vassilev (2014) focused on the management regimes within syntaxa of semi-natural grasslands. Several authors contributed with papers focused on Ponor Special Protection Area (Natura 2000). Among them are Dimitrov & Petrova (2014) who investigated forest habitats, Pedashenko & Vassilev (2014) studied the flora in the same area, Tzonev et al. (2014) did a research on scrub, grassland and rocky habitats and Vassilev et al. (2014) studied grassland vegetation.

The aim of the present study is a complete investigation and mapping of grassland habitats of Community importance on the territory of Godech Municipality, West Bulgaria.

Materials and Methods

Study area

Godech Municipality covers around 375 km². The two Sites of Community Interest cover ca. 76% of the municipality territory. Over 50% of the territory has an elevation between 1000 and 1600 m, while territories with an elevation between 600 and 1000 m account for 45.78 %. Almost 48% of the area is build up by the rocks of Iskar Carbonate Group, represented mainly by limestones, dolomitic limestones, dolomites and less shales, sandstones, siltstones. Together with the West Balkan Carbonate Group (7.52%), which covers the northern slopes of Chepan Mountain, they are a basis for karstification. The Petrohan Terrigenous Group (15.38%) includes breccia, conglomerates and sandstones and it can be found along the famous road. Quaternary alluvial deposits mainly cover the floodplains and the river terraces along the municipality (Bonchev, 1910).

The main river in the municipality is Nishava and its main tributaries are Glutnitsa and Arakul Rivers. The main soil types are *rendzic Leptosols*, *LPk* and *eutric Cambisols*, *CMe* (Ninov, 2002).

Habitat investigation and mapping

The habitat and vegetation sampling was conducted during the 2019 and 2020 field seasons, following the Braun-Blanquet approach (Braun-Blanquet, 1965; Westhoff & van der Maarel, 1973). A total of 418 relevés were collected. They were contributed to the Balkan Vegetation Database (Vassilev et al., 2020) and Balkan Dry Grassland Database (Vassilev et al., 2012b). All relevés were plotted in the homogenous areas of grassland communities and were subsequently assigned to relevant habitat types. Habitat types were determined according to Directive 92/43/EEC (Interpretation Manual of European Union Habitats, 2013; Kavrakova et al., 2009) and subsequently related to the revised version of the EUNIS system (Chytrý et al., 2020) and to the Palearctic habitat classification (Devillers & Devillers-Terschuren, 1996). Additionally, data was collected from 3422 field verification points, evenly set on the whole territory of the municipality. All the data collected in the field was applied in order to build a precise habitat map of the area.

Mapping was done using the ArcGIS 10.0 software package (ESRI 2011). Spatial data was collected in the field using GPS devise Juno BS by Trimble and was later laid over the most recent orthophoto images available. The habitat map was created by the help of the "Intersect" tool by combining the layers, containing forestry data from Forestry Management Plans, as well as data about agricultural areas and habitat data from habitat mapping of NATURA 2000 in Bulgaria. Later, the "Cut polygon" tool was used in order to modify polygon geometry. All the polygons were outlined manually

using all the field collected data as well as the orthophoto images. The habitat map was elaborated in scale 1:5000.

Results

Habitat diversity

As a result of the investigation eight grassland habitat types were established: 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites), 6230 * Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe), 62A0 Eastern sub-mediteranean dry grasslands (*Scorzoneratalia villosae*), 62D0 Oro-Moesian acidophilous grasslands, 6410 *Molinia* meadows on calcareous, peaty or clayey-siltladen soils (*Molinion caeruleae*), 6430 Hydrophilous tall herb fringe communities of plains and the montane to alpine levels, 6510 Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*), and 6520 Mountain hay meadows included in Directive 92/43/EEC. They cover a total of 121.31 km² or 32.3% of the whole territory of Godech municipality (Fig. 1).

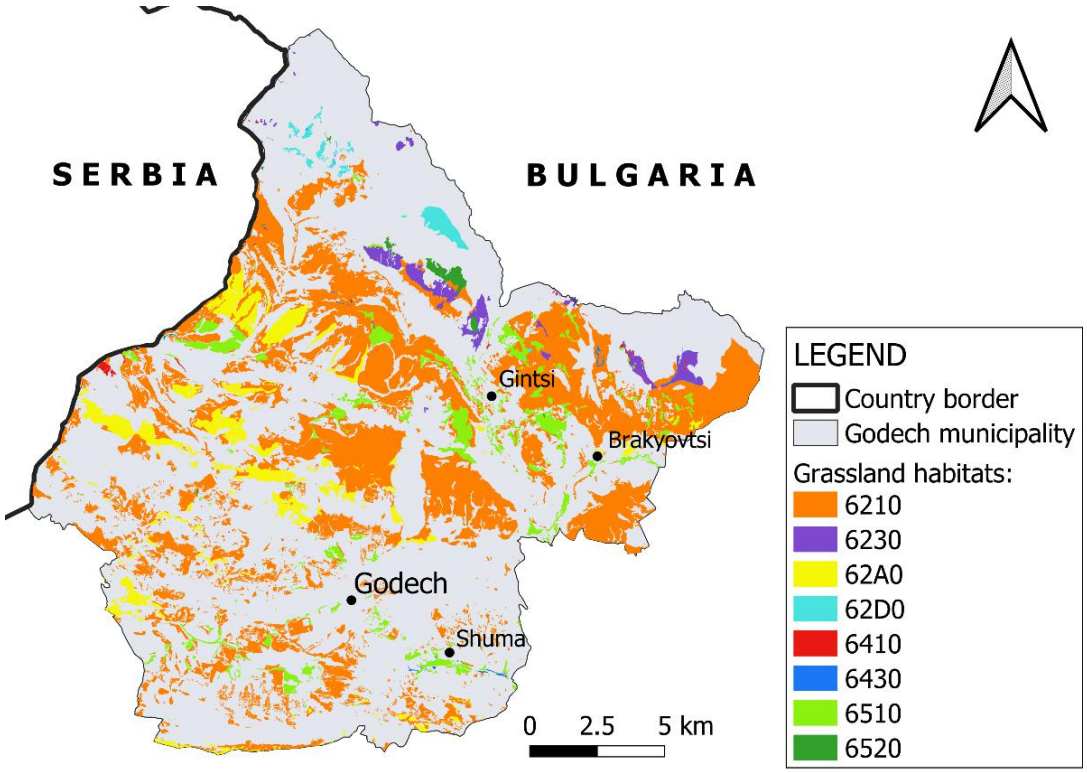

Fig. 1. Habitat map of Godech Municipality.

6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (important orchid sites)*

EUNIS: E1.222 Moesio-Carpathian steppes, E1.234 Moesio-Carpathian meadow steppes; PAL. CLASS.: 34.3161 Moesio-Carpathian steppes, 34.3163 Moesio-Carpathian meadow-steppes.

Abiotic characteristic: It was the most widespread habitat type, covered an area of 92.7 km² and represented by 1644 polygons. It was equally distributed in the range between 600 and 1600 m a.s.l. Stands covered slopes with different exposition. Terrains were predominantly flat or slightly inclined (up to 20°) and rarely steep (up to

40-50°). Soils were shallow to moderately deep. The bedrock types were diverse – sediments, silicates and metamorphic rocks. The vegetation was used for haymaking and as pastures.

Vegetation structure: The phytocoenoses of this habitat type had semi-open to closed horizontal structure with total cover of 90-100%. The vertical vegetation structure consisted of two well developed layers. The first layer reached a height of 40-120 cm and was composed of grasses such as *Chrysopogon gryllus, Festuca dalmatica, F. pseudodalmatica, Dichanthium ischaemum, Stipa capillata, S. eriocaulis, Danthonia alpina, Poa angustifolia, Agrostis capillaris, Brachypodium pinnatum, Briza media* as well as some herbs such as *Filipendula vulgaris, Agrimonia eupatoria*. The second layer was more species-rich and included all other species of the phytocoenoses. Species of higher cover and abundance were *Trifolium repens, T. alpestre, Leontodon hispidus, Dorycnium herbaceum, Lotus corniculatus, Astragalus onobrychis, Medicago falcata, Eryngium campestre*, etc. In some stands, rich of lichens and bryophytes, a third layer of cryptogams was formed above the ground.

This habitat type included two ecologically different grassland vegetation types – xerophilic grasslands of *Festucion valesiacae* alliance and xero-mesic grasslands of *Cirsio-Brachypodion pinnati* and *Chrysopogono-Danthonion* alliances (Vassilev, 2012; Vassilev et al., 2012a). Xerophilic grasslands were dominated by tussock-forming grasses such as *Stipa capillata, S. eriocaulis, Festuca dalmatica, Dichanthium ischaemum, Poa angustifolia* and *Chrysopogon gryllus*. Other species of higher cover and abundance were *Medicago falcata, Eryngium campestre, Coronilla varia, Astragalus onobrychis, Ononis arvensis*. They were widespread on the whole territory of the municipality at lower altitudes (up to 1000-1200 m) within the oak and beech forest belts. This vegetation was adjacent to or formed mosaics (complexes) with phytocoenoses of habitat 62A0 Eastern sub-Mediteranean dry grasslands and alliance *Saturejion montanae* (northern slopes of Chepan Mts).

The xero-mesic grasslands were found generally at higher altitudes (800-1500 m) or at lower altitudes but on slopes with northern or western expositions. Sometimes they were found as strip vegetation in the ecotone zone, beside or within forests, where remnants of abandoned meadows were present. Most of this vegetation belonged to alliance *Chrysopogono-Danthonion* and association *Agrostio-Chrysopogonetum*, where the bedrock type was silicate. Species of higher cover and abundance were *Festuca pseudodalmatica, Agrostis capillaris, Briza media, Danthonia alpina, Filipendula vulgaris, Anthoxanthum odoratum, Dorycnium herbaceum*. This vegetation had transitional species composition with the communities of alliance *Cynosurion cristati* of class *Molinio-Arrhenatheretea* and share some common species such as *Leontodon hispidus, Lotus corniculatus, Trifolium repens, T. pratense, Cynosurus cristatus, Leucanthemum vulgare, Rhinanthus rumelicus, R. angustifolius*, etc. On the other hand, communities of alliance *Cirsio-Brachypodion pinnati* were restricted to calcareous bedrock with soils shallow to moderately-deep. This vegetation type had widest distribution on the territory of Ponor Mt, where it was presented by two associations – *Hieracio pilosello-Festucetum dalmaticae* Vassilev et al. 2012 and *Galio lovcense-Artemisietum chamaemelifoliae* 2010 (Pedashenko et al., 2010; Vassilev et al., 2012a). The dominant species was *Brachypodium pinnatum*. Other species of higher cover and abundance were *Sesleria latifolia, Thymus longicaulis, Briza media, Artemisia chamaemelifolia*.

Threats: Invasion of shrubs and trees, natural succession of pastures and meadows to shrub and forest vegetation, abandonment of pastures and meadows, ruderalization.

62A0 Eastern sub-Mediteranean dry grasslands (Scorzoneratalia villosae)

EUNIS: R1A1 Helleno-Balkanic *Satureja montana* steppes; PAL. CLASS.: 34.311 Helleno-Balkanic savory steppes.

Abiotic characteristic: This habitat type was presented by 213 polygons and covered 13.9 km^2. It was found predominantly on eastern and southern facing slopes of Vidlich hill, Ponor Mts and Mala planina Mts, and northern slopes of Chepun Mt. up to 1000 m a.s.l. Terrains were flat to moderately inclined – up to 25-30°. The bedrock type was of carbonate and dolomite rocks. Soils were predominantly shallow and rarer moderately deep, dry with rough microreleif and calcareous outcrops. The vegetation was used for grazing only at some localities, situated close to the settlements. Most of the distant localities of this habitat type were abandoned and not managed any longer.

Vegetation structure: Species-rich communities with semi-open horizontal structure and total cover between 75-95%. The cover of rocky outcrops was on average 10-15%. Mosses and lichens were well presented in most phytocoenoses and had a cover in the range 8-20%. In the species composition, no prominent dominant was found. Subdominant species were *Festuca dalmatica*, *Artemisia alba*, *Satureja montana* subsp. *kitaibelii, Potentilla cinerea*, *Dichanthium ischaemum*, *Thymus callieri*, *Stipa capillata*. Some species of conservation value were also found, such as *Chamaecytisus jankae, Ch. calcareous, Himantoglossum jankae, Hypericum rumeliacum, Astragalus wilmottianus, Achillea clypeolata, Tragopogon balcanicus, Edraianthus serbicus, Festuca stojanovii*, etc. Many obligate calciphiles (such as *Anthyllis montana*, *A. vulneraria*, *Inula oculus-christi*, *Koeleria nitidula*, *Rhodax canus*, *Sesleria latifolia*, *Trigonella gladiata*) and facultative calciphiles (such as *Chamaecytisus jankae*, *Hypericum rumeliacum*, *Achillea clypeolata*, *Aethionema saxatile*, *Amygdalus nana*, *Asyneuma anthericoides*, *Corothamnus procumbens*, *Hyacintella leucophaeae*, *Thymus striatus*, etc.) were also distributed (Velchev 1998). The vegetation of this habitat type was referred to alliance *Saturejon montanae* and class *Festuco-Brometea*.

Threats: Invasion of shrubs and trees, natural succession to shrub and forest vegetation, abandonment of pastures, development of quarry activities.

*6230 * Species-rich Nardus grasslands, on siliceous substrates in mountain areas*

EUNIS: R4318 Oro-Moesian mat-grass swards; PAL. CLASS.: 36.318 Oro-Moesian mat-grass swards.

Abiotic characteristic: This habitat type was found in the central and northern parts of the municipality (the northern parts of Vidlich Ridge, Berkovska and Ponor Mountains) in the oak and beach belts. It was represented by 49 polygons, mainly distributed in Berkovska Mt. (the southern slopes of Kom Peak and Malak Kom Peak).

In the valley between Vidlich Ridge and Berkovska Mt., the habitat was found in some small areas only. The habitat occurred on flat or slightly inclined terrains up to 10-15°. Slope exposition varied. The most frequent rock types were silicates and limestones. These grasslands were used as pastures with this intensity significantly declined in the past three decades.

Vegetation structure: Moderately species-rich communities with closed horizontal structure and total cover 95-100%. The only dominant species was *Nardus stricta*. Other species of higher cover and abundance were *Agrostis capillaris*, *Festuca rubra* agg., *F. airoides*, *Lerchenfeldia flexuosa*, *Chamaespartium sagittale*, *Thymus longicaulis*. This vegetation was related to the alliance *Violion caninae* of class *Nardetea strictae* and *Potentillo ternatae-Nardion strictae* of class *Juncetea trifidi*. The *Violion caninae* alliance was found at lower altitudes (800-1300 m a.s.l) in the beech forest belt. The stands of

Potentillo ternatae-Nardion strictae alliance (in Ponor Mt, Vidlich hill) included some subalpine species and were found at higher altitudes (1500-2016 m a.s.l.) on the territory of Berkovska Mt. As a result of pasture abandonment, the cover of *Nardus strcta* in the communities decreased whereas the cover of *Agrostis capillaris*, *Lerchenfeldia flexuosa*, *Chamaespartium sagittale*, *Festuca rubra* agg. increased.

Threats: Pasture abandonment and subsequent shrub encroachment.

6410 Molinia meadows on calcareous, peaty or clayey-siltladen soils (Molinion caeruleae)

EUNIS: R371 *Molinia caerulea* meadows and related communities; PAL. CLASS.: 37.31 Purple moorgrass meadows and related communities.

Abiotic characteristic: This habitat type had local distribution in the central and northern parts of Godech municipality (Godech lowland, Berkovska Mt. and Ponor Mt.). It was found between 600 and 1600 m a.s.l., covered 0.34 km² and was represented by 23 polygons. All the habitat polygons had small sizes and were located along river tributaries and areas with high water levels. Frequently, this habitat type was found next to habitats 6430 and 6510. Terrains were flat and soils deep, humid and clayed. Soil moisture was variable during the year and frequently dried out in July-September period. The bedrock type was predominantly silicate and rarer calcareous (Ponor Mt.). Most of these grasslands were used as pastures, which lead to eutrophication, trampling, loss of vegetation and degradation of the plant communities. At some localities, grasslands were also used for haymaking.

Vegetation structure: Moderately-species rich communities with closed horizontal structure and total cover 90-100%. Dominant species was *Molinia caerulea* with cover 60-90%. Mesic species predominated in the species composition, such as *Agrostis capillaris*, *Festuca pratensis*, *F. rubra* agg, *Serratula tinctoria*, *Bistorta major*, *Sanguisorba officinalis*, *Cynosurus cristatus*. This habitat frequently formed complexes with habitat 7140 or were neighboring to the latter or 6510. The vegetation belongs to alliance *Molinion caeruleae* W. Koch 1926, order *Molinietalia caeruleae* W. Koch 1926 and class *Molinio-Arrhenatheretea* Tüxen 1937.

Threats: Intensive grazing, over trampling, ruderalization.

6430 Hydrophilous tall herb fringe communities of plains and the montane to alpine levels

EUNIS: R551 Screens or veils of perennial tall herbs lining watercourses, R553 Shady woodland edge fringes, R5672 Moesian tall herb communities; PAL. CLASS.: 37.71 Watercourse veils, 37.72 Shady woodland edge fringes, 37.872 Moesian tall herb communities.

Abiotic characteristic: This habitat type had a limited distribution from 600 to 1600 m a.s.l., covered an area of 0.31 km² and was represented by 40 polygons. Terrains were flat to moderately inclined up to 10°. It was found in floodplain areas on rather wet and nutrient-rich soils. The latter were shallow to moderately deep. The ground water usually decreased in dry summer periods in the central part of the municipality. In some stands of subtype 37.8 along river banks they are rich of gravels and stones. Bedrock type was predominantly silicate. Some stands were used as pastures.

Vegetation structure: Species-poor communities with closed horizontal structure and total cover of 90-100%. The maximum of vegetation development was in the second half of summer. The strong shade effect led to low presence of bryophytes and the litter formed separate layer with cover about 70-90%. This habitat was presented by two subtypes: 37.7 Wet and nitrophilous tall herb edge communities, along water courses and

woodland borders related to the *Glechometalia hederaceae* and the *Convolvuletalia sepium* orders (*Senecion fluviatilis*, *Aegopodion podagrariae*, *Convolvulion sepium*, *Filipendulion*) and 37.8 Hygrophilous perennial tall herb communities of montane to alpine levels of the *Betulo-Adenostyletea* class. The phytocoenoses of subtype 37.7 were dominated by broad-leaved tall forbs *Filipendula ulmaria* as well as *Mentha longifolia* and *Aegopodium podagraria*. In the species composition, some hygrophyte species were found (e.g. *Carex riparia*, *Lythrum salicaria*, *Epilobium hirsutum*, *Mentha longifolia, Angelica sylvestris*) and mesic ones (e.g. *Festuca pratensis*, *Agrostis stolonifera*, *Deschampsia caespitosa, Molinia caerulea*) also. Subtype 37.8 was dominated by *Petasites hybridus*, *Trollius europaeus* and *Cirsium appendiculatum*. The vegetation of this habitat subtype was related to alliances *Cirsion appendiculati* Horvat et al. 1937, *Adenostylion alliariae* Br.-Bl. 1926 and *Petasition officinalis* Sillinger 1933 and class *Mulgedio-Aconitetea* Hadač et Klika in Klika et Hadač 1944.

Threats: Grazing, trampling, eutrophication.

6510 Lowland hay meadows

EUNIS: R2232 Moesio-Thracian hay meadows; PAL. CLASS.: 38.252 Moeso-Thracian mesophile hay meadows.

Abiotic characteristic: This habitat type had wide distribution on the territory of municipality. It was represented by 443 polygons and occupied a total area of 11.53 km^2. The habitat was found on flat terrains (riverside terraces and ponors) or on slightly inclined terrains up to 10^o in the lower parts of the mountain slopes. Rocks were silicates, and soils alluvial and delluvial with high contents of clays. The vegetation was managed as pastures and meadows. These territories in Godech Valley have been periodically ploughed up for the last 20 years. There were also abandoned agricultural lands undergone a natural succession towards habitat 6510.

Vegetation structure: This habitat was represented by species rich mesic grasslands with closed horizontal structure and total cover in the range 90–100%. The vegetation was dominated by mesic grasses such as *Arrhenatherum elatius*, *Festuca pratensis*, *F. rubra* agg., *Alopecurus pratensis*, *Cynosurus cristatus*, *Poa pratensis*, *Trisetum flavescens*, *Anthoxanthum odoratum*, *Agrostis capillaris*, *Holcus lanatus*, *Lolium perenne*. In the species composition, other species of higher cover and abundance were *Trifolium repens*, *T. pratense*, *T. campestre*, *Lathyrus pratensis*, *Lotus corniculatus Leontodon autumnalis*, *L. hispidus*, *Convolvulus arvensis*, *Plantago lanceolata*, *Centaurea jacea*, *Daucus carota*, *Filipendula vulgaris*, *Betonica officinalis*, *Stellaria graminea*. This vegetation is related to class *Molinio-Arrhenatheretea* Tüxen 1937, order *Arrhenatheretalia elatioris* Tüxen 1931, alliances *Arrhenatherion elatioris* Luquet 1926, which included four associations (*Ranunculo repentis-Alopecuretum pratensis* (Eggler 1933) Ellmauer in Mucina & al. 1993, *Pastinaco sativae-Arrhenatheretum elatioris* Passarge 1964, *Cirsio cani-Festucetum pratensis* Májovský ex Růžičková 1971 and *Ranunculo bulbosi-Arrhenatheretum elatioris* Ellmauer in Mucina & al. 1993) and *Cynosurion cristati* Tüxen 1947 presented by two associations (*Bromo racemosi-Cynosuretum cristati* Horvatić (1930) 1958 and *Festuco rubrae-Agrostetum capillaris* Horvat 1951).

Threats: Abandonment, lack of mowing, overgrazing, plowing.

6520 Mountain hay meadows

EUNIS: R1M2 *Agrostis-Festuca* grassland, R235 Balkan mountain hay meadows; PAL. CLASS.: 35.12 *Agrostis-Festuca* grasslands, 38.3 Mountain hay meadows.

Abiotic characteristic: This habitat type had a local distribution on the territory of Berkovska Mt. and Ponor Mt. over 1000 m a.s.l. It was presented by 10 polygons only

and occupied a total area of 0.99 km^2. Terrains were flat to moderately inclined up to 10°. The slope expositions were predominantly northern and western. Soils were moderately deep and moist during the year. The climate was temperate with typical high air humidity and small amplitudes during the vegetation season. The bedrock was of silicate origin. The vegetation was used for mowing and as pastures.

Vegetation structure: Moderately species-rich communities with closed horizontal structure and total cover 90-100%. Dominant species were *Agrostis capillaris*, *Festuca rubra* agg., *Arrhenatherum elatius*. Other species of higher cover and abundance (up to 5-10%) were *Cynosurus cristatus*, *Festuca pratensis*, *Holcus lanathus*, *Trifolium alpestre*, *T. montanum*, *T. medium*, *Veratrum lobelianum*, *Hypericum maculatum*, *Pastinaca hirsuta*, *Filipendula vulgaris*. This vegetation represented secondary grasslands, found at the areas of former beech, common hornbeam and oak forests. In the species composition were found some species from classes *Festuco-Brometea* (such as *Festuca pseudodalmatica*, *Danthonia alpina*, *Briza media*, etc.) and *Nardetea strictae* (*Nardus stricta*, *Chamaespartium sagittale*, *Lerchenfeldia flexuosa*). These phytocoenoses were related to alliance *Cynosurion cristati*, order *Arrhenatheretalia elatioris* and class *Molinio-Arrhenatheretea*.

Threats: Abandonment, lack of mowing, overgrazing.

Discussion

This is the second municipality in Bulgaria where all habitat types, protected by the Council Directive 92/43/EEC, are studied and mapped, using the scale of 1 : 5000. Grigorov et al. (2021) conducted similar research on grassland habitats in Dragoman Municipality where six grassland habitat types were distinguished. Grassland habitats in Godech Municipality have also been strongly influenced by anthropogenic activities. Three of the habitat types cover the largest proportion of the territory – 6210, 62A0 and 6510. Habitat 6210 has both xero-mesic and xeric communities located mainly in the central and northern municipality areas. Habitat 62A0 is characterized by xeric grasslands on carbonate rocks to the west and habitat 6510 consists of mesic plant communities that can be discovered on flat terrains or on slopes with up to 5-6^0 inclination in Vuchibaba hill and Ponor Mts.

The NATURA 2000 ecological network plays its important role for the conservation and condition improvement of the habitats, partially because of the subsidies for agriculture. In the same time, areas where agricultural activities have occurred in the past, are now turning into grasslands. The three main grassland habitats (6210, 62A0 and 6510) in Godech Municipality were abandoned in the years followed the end of the socialist period in Bulgaria (1990 year). Similar problems were observed by Vassilev et al. (2011). Wherever grazing occurs, the problem of overgrazing takes its toll. Another problem is tied to the shrub encroachment into grasslands. Habitats that are located around the depopulated boundary areas are not in a good condition. Some meadows and pastures in the flat terrains of the Godech hollow are also plowed and transformed into agricultural lands. They are turning into shrublands and the issue with invasive species should not be taken lightly as well. Invasion of *Robinia pseudoacacia* from its plantations to the grasslands nearby also occurs.

Knowledge on the habitat distribution and condition in the studied area is of a particular importance for their protection by the Council Directive 92/43/EEC within the Natura 2000 sites of Dragoman (BG0000322) and Western Balkan Range and Forebalkan (BG0001040).

Conclusions

This research explores the diversity of grassland habitats of Community importance in Godech Municipality (West

Bulgaria), protected by the Directive 92/43/EEC. Two Sites of Community Interest are present on the municipality territory – BG0000322 and BG0001040 as part of the Natura 2000 network. The study is based both on 418 original phytocoenological relevés and on 3422 field point observations for habitat type verification. A total of eight grassland habitat types was established in the studied area – 6210, 6230, 62A0, 62D0, 6410, 6430, 6510 and 6520. All grassland habitat types considered according to the Interpretation Manual of European Union Habitats (2013) and additionally mapped in scale 1 : 5000.

The intensive human activities or the lack of any negatively impact the grassland habitats and define more of the threats. Among the main grassland habitat threats observed on field could be mentioned: abandonment, lack of mowing, shrub encroachment, and intensive grazing, over trampling, plowing, eutrophication and subsequent ruderalization.

Acknowledgements

This investigation was carried out with the financial help of the NSP "Young scientists and postdoctoral students, 2020", contract № 22-603/09.03.2020.

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Received: 29.03.2022
Accepted: 17.05.2022