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DISTRIBUTION GENUS BROMUS SPECIES INTO THE STEPPE ZONE OF UKRAINE

*This article presents the results of a survey on distribution of genus Bromus plants in Steppe zone of Ukraine conducted in 2012-2013 years. It has established, that in this zone there are 9 species of genus Bromus. The most widespread species, which is a problem as segetal weed in crops spiked culture, *Anisatha tectorum* (L.) (*Bromus*), which for today has spread even in the southern part of the left-bank forest-steppe zone of Ukraine.*

Keywords: Genus *Bromus*, steppe zone of Ukraine, *Anisatha tectorum* (L.) (*Bromus*)

Introduction. Changing of the status and level of natural (temperature, rainfall, length of growing season) and anthropogenic (structure of sown areas, spread short-rotation shifts of crops, changing of predecessors, and the intensity of mechanical tillage of soil, herbicides recruitment) factors lead to the changes in species composition of plants not only to composed segetal, but ruderal communities of synanthropic vegetation of Ukraine (Mirkin, 1990; Ivashchenko, 2000, 2004). The aim of our work was to determine the species composition and the level of presence of *Bromus* species in the field and ruderal ecotopes of Steppe Zone of Ukraine.

Materials and methods. Forwarding, field examination of agricultural land of Steppe Zone of Ukraine carried out during 2012 in the following areas: Lugansk, Donetsk, Dnepropetrovsk, Zaporozhye, Kherson, Mykolayiv, Odesa and Crimea.

In total, the study was conducted in 41 administrative districts. In 2013 the similar works performed in the right bank of the steppe and forest-steppe zones, which include Mykolayiv, Kherson, Kirovograd, Cherkassy, Kiev, Zhytomyr, Vinnytsia, Khmelnytsky, Rivne areas and Crimea. In sum, 46 districts were inspected at these areas.

The main methods used during field work were route studies with species composition of weeds describing in the genus *Bromus* points of observation. When planning routes and observation points it was accounted for completeness coverage of existing agroecosystems.

The specific name of the genus *Bromus* are filed for nomenclature reference «Vascular plants of Ukraine. A nomenclatural checklist» (S.L. Mosyakin, M.M. Fedoronchuk, 1999). The frequency of occurrence and distribution were determined by standard methods with some of our amendments (S. Raunkiyer, 1934; A.P. Shennikov, 1964; N.S. Kamyshovoe, 1978; V.I. Chopyk and others, 1998; Y.V. Budyonny, V.S. Zuzva, 2000; M.O. Bilyk et al., 2005). By the term occurrence we mean uniformity presence of species in a defined area, which was determined by comparing the frequency of the presence or absence of species in each zone, region or district, separately conducted points of registration. This term was used in place of a widespread literature "happened". By the term spread we understood the location of the weeds in the genus *Bromus* areas within each zone, region or area (and the I.M. Gregory, V.A. Solomaha, 2000 - placing the species in phytocenoses).

Distribution of species of the genus *Bromus* we presented in a five-point scale: 1) solitary - some plants are located throughout at considerable distances from each other; 2) insular - sequestered spot or diffuse group of weed population is located in a small area or territory; 3) sporadically - weed populations are located as separate patches, groups or scattered diffusely in the

environmentally designated areas phytocenoses or floristic complexes ; 4) disseminated - plants are located more or less evenly throughout some territory or at considerable distances from each other solitary or by groups; 5) diffused - the plants are uniformly located throughout the territory solitary or in groups on small distance from each other.

Identification of plants species was carried out by the determinant atlases and floras (A.I. Barbarych and others. 1970 Prokudin Y.N and others., 1999; Flora of Europe part of USSR Vol.1 - 8, Flora of Eastern Europe Vol.9 -12 , Flora of the USSR. Vol.1 -12. etc.). In some cases, data on some species of the genus *Bromus* weeds were refined by us in herbarium papers and summaries of other authors.

Results and discussion. In agricultural crops , between sowing corps and ruderal ecotopes of Steppe Zone of Ukraine we have found 9 species of the genus *Bromus* (*B. arvensis* L., *B. japonicus* Thunb., *B. secalinus* L., *B. squarrosus* L., *B. commutatus* Schrad., *B. wolgensis* Fisch. ex Jacq., *Anisantha tectorum* (L.) Nevski = *Bromus tectorum* = *Zerna tectorum*, *Anisantha sterilis* (L.) Nevski = *Br. sterilis*, *Bromopsis inermis* (Leyss.) Holub = *Bromus inermis* (see the table).

All species of the genus *Bromus* in the steppe zone of Ukraine usually or often are distributed mainly in ruderal and between sowing ecotypes , while in agrophytocenoses they are rare or very rare. Such species as *B. commutatus* and *B. wolgensis* occurred very rarely even in ruderal habitats (Table).

By the greatest frequency of occurrence species of *Bromus* is characterized the Northern Steppe zone (Lugansk, Donetsk , Dnipropetrovsk, Odessa areas), where the frequency of their occurrence was assessed as "often" or "usual", because these species in large numbers were always In the dry steppe zone (Kherson and Crimea Prysyvashshya) these types were characterized by lowest frequency of occurrence. According to our scale "very rare "This is due most likely to the fact that most species of the genus *Bromus* are mesophytic or kseromezophytic. Accordingly, the level of presence of all species of the genus *Bromus* was highest in the northern steppe administrative regions, and the lowest - in the dry steppe areas of Prysyvashshya.

On the average in the steppe zone the level of revealed the presence of all species of the genus *Bromus* was low on segetal ecotypes and ranged from 2-4 to 11-12 pieces/m² pieces/m². In ruderal ecotopes the level of species of the genus *Bromus* presence was 5-10 times higher than in segetal ecotypes, and ranged from 11-19 to 40-62 pieces/m² pieces/m² .

In between sowing and ruderal ecotopes actually across the steppe zone *Bromopsis inermis* = *Bromus inermis* Leyss. Was found and several other species of the genus *Bromopsis* were detected.

In Dnipropetrovsk (Apostolovsky District), Odessa (Ovideopolsky District) Mykolaiv (Bashtansky District), Zaporizhia (Berdyansk, PriAzov District) and Kherson (Henichesk District) regions is occasionally occurred even a new one alien species - *Anisantha sterilis* = *Bromus sterilis* L.). While the threat to crops from him is not yet detected, but his appearance on the ends of fields and in between sowing ecotypes provides substantial reason to believe that in the nearest future it can be detected in crops and its expansion can wear the same character as with *Anisantha tectorum*. In agrophytocenoses (sown cereals, legumes and fodder crops) in all subzones Steppe of Ukraine and especially in the East and South of Ukraine (Lugansk, Donetsk, Zaporozhye, Kherson , Mykolaiv, Odesa region. Crimea) is extremely widespread (frequency of occurrence 60 -80 % density - up to 240-260 pieces/m² and more) *Anisantha tectorum* = *Bromus tectorum*) - annual wintering segetal extremely drought - ruderal weed. As a result of research carried out in 2013 , this type is intensively distributed in forest-steppe zone of Ukraine. Today its distribution area in the right-bank forest-steppe Ukraine covers Kirovograd, Cherkassy, Vinnitsa and Kiev region. Researches on industrial crops has shown that at high presence *Anisantha tectorum* in agrophytocenoses the loss of crops , in the absence of struggle with this weed, can exceed 80 % or more.

Table

Distribution, occurrence and level of presence of species of the genus *Bromus* etc. in the steppe zone of Ukraine

Species	Distribution		Occurrence		Level of presence, pcs/m ²	
	Level	Area	Frequency	Location	In crops	In ruderal areas
<i>Bromus secalinus</i>	diffused or sporadically	SN, SS, SD	Seldom	Segetal-ruderal, in crops of winter and spring cereals and perennial grasses along roads, shelterbelts, at home, locations covered with weeds	2-6	10-12
<i>Br. arvensis</i>	diffused or sporadically	SN, SS, SD	Seldom	Segetal-ruderal, in crops of winter and spring cereals, pastures, along roads, shelterbelts, at the ends of fields, locations covered with weeds	4-5	7-8
<i>Br. squarrosus</i>	diffused or sporadically	SN, SS, SD	Often	Ruderal-segetal on locations covered with weeds, meadows, fallow, orchards and grapes. along roads, shelterbelts, in crops of cereals, pulses, perennial grasses	9-14	38-50
<i>Br. japonicus</i>	diffused	SN, SS, SD	usually	Ruderal on locations covered with weeds, along roads, embankments, belts, , at the ends of fields, fallows	3-4	87-92
<i>Br. commutatus</i>	solitary or diffused	SN, SS	very seldom	Ruderal on on locations covered with weeds, meadows, along roads, shelterbelts	–	1-9
<i>Br. wolgensis</i>	solitary or diffused	SN, SS	very seldom	Ruderal on pasture, fallow lands, along roads, streets	–	2-6
<i>Anisantha tectorum</i> = <i>Bromus tectorum</i>	diffused	SN, SS, SD	usually	Segetal-ruderal in winter crops, perennial grasses, orchards, vineyards, fallows, at the ends of fields, along roads, streets, embankments, belts	140-160	200-600
<i>Anisantha sterilis</i> = <i>Br. sterilis</i>	solitary	SN, SS	very seldom	Segetal along roads, streets, embankments	–	2-5
<i>Bromopsis inermis</i> = <i>Bromus inermis</i>	sporadically or чи diffused	SN, SS, SD	usually	Segetal-ruderal in winter crops, perennial grasses, orchards, vineyards, fallows, at the ends of fields,, along roads, streets, embankments, belts	1-3	7-12

SN - Northern steppe, SS - Southern steppe, SD - Dry steppe

Conclusions.

1. Genus *Bromus* is represented in the flora of the steppe zone of Ukraine by 9 species. The most common among them for today is *Anisantha tectorum* = *Bromus tectorum*, which twenty years ago as a part of weedy groups practically was not occurred. Today, this species has spread widely in the Steppe and southern part of Forest-steppe zones in sowings of winter crops, especially wheat.

2. *Anisantha (Bromus) tectorum* is quite active phytocoenotic alien plant that is able to displace other species in natural and artificial phytocenoses, occupying more and more territory.

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Анотація

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Поширення видів роду *Bromus* у зоні Степу України

В статті представлені результати обстеження орних земель Степової зони України, проведені в 2012-2013 рр., було виявлено поширення видів роду *Bromus*. Встановлено, що найчастіше трапляється *Anisantha (Bromus) tectorum*, який представляє загрозу як сегетальний бур'ян зернових колосових культур і на сьогодні трапляється навіть в південній частині лівобережного Лісостепу України.

Ключові слова: Рід *Bromus*, зона Степу України, *Anisantha (Bromus) tectorum*

Аннотация

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Распространение видов рода *Bromus* в зоне Степи Украины

В статье изложены результаты обследования распространения растений рода *Bromus* в зоне Степи Украины, проведенного в 2012-2013 гг. Установлено, что в данной зоне встречается 9 видов рода *Bromus*. Наиболее распространенным видом, который составляет проблему как сегетальный сорняк в посевах зерновых колосовых культур, является Анизанта (Бромус) кровельная, который на сегодня распространился даже в южной части левобережной Лесостепи Украины.

Ключевые слова: род *Bromus*, зона Степи Украины, Анизанта (Бромус) кровельная