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TO THE QUESTION OF THE PREVALENCE OF WEEDS.

The notion "weed" has been analysed. The species diversity of weed vegetation has been showed. It has been proposed to classify weeds on their prevalence by 5 groups, using for this as a criterion occurrence and dominant role of separate species in vegetate-field community.

Key words: weeds, prevalence of weeds, occurrence of weeds

Introduction. The problem of weeds has been existing as many millenia as agriculture. However this question started having scientific basis after world recognition of K. Linear's binomial nomenclature which made possible to systemize all living things on Earth and in particular weeds. Prior to that in every country and even in every region, the same species had had different names and it had prevented making certain generalizations and understand which biological object was mentioned.

Regarding Russia it is known that A. T. Bolotov – an author of fundamebtal discoveries in the field of sceintific agriculture started researching a fight against certain types of weeds in grain crops. But a systematized work on weeds has become a classic book agronomy by I.A .Stebut «Weeds and their destruction» [2], in which in addition to accepted Russian and Latin names were given local names of these plants. This monograph was in fact an example of a relevant work by a German scientist E. Kirhofa with necessary additions concernig the Russian lands. In the book there are 230 species of field and meadow weeds which have been significantly spreaded in the central European part of Russia.

A significant impetus for the expansion of herbological research in the Russian Empire was the creation of the Bureau on Applied Botany in 1984, which main purpose was to discover cultivated and wild plants, in particular weeds. Over time, this institution was transformed to the world famous All-Russian Research Institute of Plant Industry. The largest contribution to the study of weeds within the former Soviet Union has made a scientist of this institution Academician A.I. Maltsev, who started discovering this field from the beginning of the twentieth century. He is a co-author of the four-volume work «Weeds the USSR», published in 1933-1934 [3]. In Ukraine in these years J.K. Pachoskyj, O.A.Yanata, I.N. Shevelov, P.I. Leschenko, V.Z. Celik were known for their works on weed vegetation. In future the number of scientists herbolohiv significantly increased, due to considerable opportunities in controlling weeds because of the mechanization of technological processes in agriculture, the general improvement in agricultural engineering and than the extensive use of herbicides.

Despite rather extensive study of weed vegetation there is some discrepancy in the interpretation of the notion "weed". On the one hand, there are scholars, who believe that this is a group of plants, which causes serious damage to agricultural plants and grasses of native grasslands. [4-7]. On another hand, it is believed weeds should be classified as unwanted plant species growing in areas where people are engaged in farming activity or in another activity which leads to impairment of primary native vegetation [8-10].Chronologically the last concept has spread a little bit later than the first one. According to the point of view above, weeds can be found on the large parts of the Earth's surface populated by human civilization, where there are favorable conditions for vegetation, not only on land but also on coastal waters. This point of view is developed and supported by American. [11] and some Ukrainian scientists [12]. This part of nuisance aquatic vegetation in intensive reproduction slows a flow of water, prevents fisheries, worsens conditions of shipping. Of course intensive process of weeds control occurs only on arable lands and under perennial and fruit plantations and vineyards.

On many other territories efforts for destruction of weed vegetation are much smaller or temporarily absent.

The Analysis of the structure of the categories of land for various purposes gives ground to believe that the problem of weeds is relevant for at least 80% of agricultural entities and herbalists. In addition to agricultural lands it could be residential areas, industrial facilities , road combinations, recreational areas, forest lands and water resources. The total amount of favorable soil and climatic conditions for agriculture and human habitation is much smaller on Earth than in Ukraine .That is why the percentage of areas where a problem of weeds can exist is estimated in two times lower.

Table 1

The structure of lands on Earth and in Ukraine [13]

	Earth		Ukraine	
	thausend km ²	%	thausend km ²	%
Agricultural lands	321180	21,6	419	69,4
in cluding arable lands	15180	10,2	331	54,8
Woods and buches	45500	30,5	104	17,3
Unwoods vegetable lanscape	11320	7,6	-	-
Under waters and marches	10300	6,9	34	5,6
Under buildings and roads	9800	6,6	25	4,1
Deseerts	22700	15,2	-	-
Others	17200	11,6	10	3,6
Total	149000	100,0	604	100,0

Some uncertainty of the notion «weed», the lack of clear distinction between wild vegetation on the one hand, and commensal element of ruderal plant communities makes it difficult, almost impossible task of determining the exact number of weed species. Thus , according to the Botanical Institute of the USSR Academy of Sciences and the Institute of Agricultural Sciences VASGNIL(1933-1935) in the 30`s of the twentieth century on the entire territory of the former Soviet Union were 1347 species of weeds. [3] Much later VV Nikitin [14] in the same range took 1035 plants to the category "weed" .The decrease in the species composition the author explains as improvement of the farming level in Ukraine. A Monograph «Weeds Ukraine», written by the scientists of the Botanical Institute of the USSR Academy of Sciences [15] includes 744 species. According to R.I. Burda [16] segetal ecosystem Ukraine has 1053 species and O. Ivashchenko [17] believes that more than 1500 species can be the potential danger. Some scientists, who have analyzed only the flora of the Ukrainian steppe zone, came to the conclusion that weeds can be presented by 735 species of higher plants [18].

Weeds are mostly presented by herbaceous plants, much less by shrubs, subshrubs and even trees [8, 14, 18]. *Acer negundo L.*, which is common in afforestation, residential areas and often competes with fruit trees, settling near tree rings, is weel known for its harmfulness [19]. In this sense *Ailanthus altissima (Mssl.) Swingle* is outstanding as well. It was introduced in 1814 in Crimea as an ornamental plant and has since been widely distributed in the southern parts of the country. It forced the quarantine service of Ukraine to attribute this view to the list of regulated non quarantine pests. Weeds considered to be some aquatic plants as attached to bottom of ponds species: *Potamogeton*, *Myriophyllum*, *Elodea*; loose and floating species: *Ceratophyllum*, *Lemna*, *Utricularia vulgaris L.*, *Salvinia nutans (L.) All* [11, 12, 14]. In some authors` opinion, stem parasite *Viscum*, which inhabits trees and fruit trees as well actively ,is also a weed[14, 20]

In systematic review almost all weeds belong to the phylum *Magnoliophyta* and only very few of them are located in the phylums *Eguisetophyta* and *Polypodiophyta*. However some scientists believe weeds have to include diatoms, green chary and blue-green algae, which some systematics consider to be lower plants [21], and others -representatives of a separate kingdom *Protista* [22]. Mosses and lichens were supposed to be weeds as well according to some domestic and foreign scientists in thr past. At high species diversity of weed vegetation certain types are not equal concernig their harmfulness. Therefore it necessary to find clear criteria which would help to divide weeds on their risk for crops and other agricultural lands and even non-agricultural lands. From the general list of plants the first weed analysts allocated only a part , giving the epithets «especially», «very burdensome», «most dangerous», «veri stubborn», «widely distributed», «importunate», «usual», «most intolerable» and analogous [2, 4].

More concrete approach to harmful role of field (segetal) weeds was proposed by A.I. Maltsev [3]. He selected a specific group of species for each region of the former Soviet Union. In general, from the total number of plants in this group, which has more than 1300 species, he named as most important 7%. N.G. Nikolaeva with the co-authors [23] divide Moldavian weeds for prevalence and accompanying.

A. Tarasov and N.F. Mikhailova [24] found 78 weeds being able to cause harm from more than 450 species which contaminate crops of the Central Russian black land regions. Among these 78, there are 10 having 100% of occurence and 14 species - less common. V.V. Nikitin proposed a reasonable division of weeds by their harmfulness for three groups [14]. To the first he took the most stable species and well-adapted to existing technologies of growing agricultural crops. In the second group there are less common weeds which are kept in crops only in case of violation of agrotechnical requirements. Finally, the third group refers to unstable or not stable enough weeds in crops. The first group included 25-30 of weeds, the second - 60-70, and the third gropup covered more than 900 types of former Soviet Union weeds.

He approaches above regarding weeds propagation and thus their harmfulness in agricultural crops are deprived of clear criteria for classification of certain species to certain groups. Therefore based on years of practice on research of farming in Kharkiv, Donetsk, Kursk oblastes (since 1974) we have worked out and have developed our own method of weeds classification. It is characterized by weeds propagation dependent on occurence of a specie in crops and its dominant role among weeds (Table 2).

Table 2

Classification weeds all over of the prevalence

Groups prevalence	% occurence of a spesie in fields	% dominating mass in the middle field weeds
I – very widely distributed	76-100	More 50
II – widely distributed	51-75	31-50
III – moderate distributed	26-50	11-30
IV – not in current use	1-25	до 10
V – very not current use	До 1	0

Occurence of certain weeds can be determined by route survey of fields in accordance with the formula:

$$B = \frac{C \cdot 100\%}{O},$$

Where **B** is occurence of a particular weed type,%;

- C is a number of surveyed fields or certain parts of territory where this specie was noticed;
O is the total number of surveyed fields or parts of territory.

If a field is occupied by several cultures, it will be necessary to take one sowing to research it separately .

In parallel to this, a similar formula helps to determine species domination. Conforming with it dominant weeds are weeds, which mass at estimation by sight is at least 10% of the all weeds total weight, presenting field group.

In terms of the Kharkiv region on the fields we found 237 species of weeds. From these to very widely distributed, widely distributed, moderate distributed, not in current use, very not current use 4.6, 7.2, 13.5, 27,4 and 47,3 % species were taken. A group of very widespread weeds has 11 species : *Echinochloa crusgali* (L.) Beauv., *Setaria glauca* (L.) Beauv., *Amaranthus retroflexus* L., *Cirsium arvense* (L.), *Sonchus arvensis* L., *Convolvulus arvensis* L., *Chenopodium album* L., *Fallopia convolvulus* (L.) A Love, *Polygonum lapathifolium* L., *Sinapis arvensis* L., *Stachys annua* L. This group, like others, is very heterogeneous, and if the first three species are unquestionable leaders among landweeds both in its size and mass , the last two ones can be put to the group very widely distributed go widely distributed.

A group of not in current use and very not current use weeds are very various in their species composition. It includes weeds which are:

a) are widely distributed in other areas of the country, but in the north -eastern Ukraine they are rare because of non-compliance of the climatic conditions to their requirements : *Centaurea cyanus* L., *Spergula arvensis* L.;

b) widely distributed in other countries but lost their positions on fields due to changes in agrotechnical conditions. Hence earlier, a very dangerous weed *Avena fatua* L., has become rare in crops as a result of sharp decrease of acreage under spring crops cereales;

c) species which are widespread in ruderal areas of a region, but are unable to exist in conditions of an intensive tillage : *Achillea millefolium* L., *Artemisia vulgaris* L.

d) species which are rare both as on fields as on uncultivated lands : *Gladiolus imbricatus* L., *Campanula rapunculoides* L.;

e) adventived plants including species which can become very dangerous weeds over time such as *Asclepias syriaca* L.

Due to the group of rare weeds a size of the list in this category of plants can vary greatly, depending on a srveyed area, its size, nature of a land and, finally a level of qualification of explorers. Very often some researchers consider the same species to be weeds and others consider them to be wild vegetation.

From a practical point of view the most relevant issue is controlling weed vegetation on fields of first four groups prevalence. Much more weeds relate to those species which are spread out in ruderal habitats and native grazing lands. Due to significantly smaller anthropogenic influence to these lands, botanical composition of weeds are much more various than on fields. Because plants grow in different environmental conditions created by a human-being but prefer certain categories of lands, some authors devise weeds to segetal, segetal - ruderal, ruderal and ruderal - segetal [14, 18]. By their estimates 16.5-22.3 5% of weeds mainly grow on croplands and 77,7 - 83,5 % are met more common in ruderal habitats , meadows and pastures.

Weed vegetation of arable land is relatively well explored. What unfortunately cannot be said about its ruderal parts. Therefore, it is important to fill the gap which would give an opportunity to estimate the role of individual species of flora in areas which are not occupied by crops. Some part of the vegetation, which is referred to weeds can have or may have different use: feeding, providing food, melliferous, decorative, soilprotecting and more. Our analysis of the weed list in the four-volume work "Weeds the USSR", which has been already mentioned above[3] showed that about 40 % of the

species have some beneficial properties for people . Therefore it is really essential to research these characteristics of certain species on lands of various purposes more intensive and to determine methods of their use or measures of limitation. In carrying out this work, it is advisable to use the proposed methodology of certain species, which will make possible to evaluate more objectively the role of specific plants in different phytocoenoses and to clarify the relevance of their inclusion to weeds.

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Анотація

Зуза В. С.

До питання поширеності бур'янів

Проаналізовано поняття «бур'ян». Показано видове різноманіття бур'янистої рослинності. Запропоновано класифікувати бур'яни по їх поширеності на п'ять груп. Використовуючи для цього в якості критерія зустрічаємість і домінуючу роль окремих видів в сегетальному угрупованні.

Ключові слова: бур'яни, поширеність бур'янів, зустрічаємість бур'янів.

Аннотация

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К вопросу распространности сорняков

Проанализировано понятие «сорняк». Показано видовое разнообразие сорной растительности. Предложено классифицировать сорняки по их распространности на пять групп, используя для этого в качестве критерия встречаемость и доминирующую роль отдельных видов в сорнополевом сообществе.

Ключевые слова: сорняки, распространность сорняков, встречаемость сорняков.