cal systems for herbicidal protection of maize depending on the weed harmfulness level and weather conditions. **Methods.** *Field experiment — for the weeds and maize yield accounting, and calculation method — for determining of the technical and economic efficiency of herbicide systems.* **Results.** *We recorded a significant decrease in the inhibitory effect of soil herbicides without precipitation, at elevated air temperature and hot dry wind in the first 5—7 days after their application. Also we specified the best pre-emergence herbicide Acris SE containing the active ingredients: Dimethenamid P (280 g/l) + Terbuthylazine (250 g/l). The number of weeds was indicated according to the experiment variants before spraying crops and 21 days after the application of toxicants. The technical and economic efficiency of combined (pre-emergence + post-emergence herbicides) and mixture of post-emergence products for protection systems of maize was determined.* **Conclusions.** *Under arid conditions, within 5—7 days after the application of pre-emergence herbicides (in 2018, the average background weed infestation of crops — 37 pcs/m^2), the chemical plant protection system based on a tank mixture of post-emergence herbicides was ahead in terms of technical efficiency, yield and profitability grain production: Frontier Optima CE (Dimethenamid, 720 g/l) + Stellar RK (Topramezone, 50 g/l + Dicamba, 160 g/l) + Metolat wetting agent. The manifestation of soil herbicide phytotoxicity in favorable weather (in 2019—2020, background weed infestation of crops 129—147 pcs/m^2) was more effective when using a combined system for controlling harmful species in the maize production technology: Dual Gold KE (S-metolachlor, 960 g/l) — before sowing + Stellar RK (Topramezone, 50 g/l + Dicamba, 160 g/l) + Metolat wetting agent — post emergence application. The best pre-emergence chemical product was Acris SE (Dimethenamid P, 280 g/l + Terbuthylazine, 250 g/l).*

herbicide system; weeds; weather conditions; technical efficiency; yield; production profitability

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DEPENDENCE OF SOYBEAN WEEDINESS

on growing conditions in the Eastern Forest-Steppe of Ukraine

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Goal. *To establish the species composition of weeds, their dominant role and determine the type and level of weediness of soybean crops for cultivation in a fixed nine-course stationary, fallow-crop-row rotation and in monoculture in the eastern part of the Forest-Steppe of Ukraine.* ***Methods.*** *The research was conducted by route surveys in field experiments.* ***Results.*** *According to the research of 2011—2017, 30 species of weeds and contaminants were found in soybean crops after winter wheat as forecrop in the stationary crop rotation (spring early and late were 60%, winter and biennial were 17%, perennial were 23%); 18 species (spring early and late were 72%, wintering and biennial were 6%, perennial were 22%) were found for cultivation in monoculture. They belonged to 16 families, the families Asteraceae (9 species), Poaceae (5 species) and Polygonaceae (5 species) were the most represented. The main weeds in soybean crops in crop rotation and monoculture were Echinochloa crus-galli (L.) Roem. et Schult., Chenopodium album L., Cirsium arvense (L.) Scop. and Panicum miliaceum L. In addition to these weeds for growing soybeans in crop rotation were present Setaria glauca (L.) Beauv., Amaranthus retroflexus L., Solanum nigrum L., Polygonum lapathifolium L., Sonchus arvensis L., Convolvulus arvensis L., and in monoculture were Ambrosia artemisiifolia L. and Xanthium strumarium L. Xanthium strumarium L. was the most dominant in the monoculture (43%), and Setaria glauca (L.) Beauv was subdominant in crop rotation (57%), and Echinochloa crus-galli (L.) Roem. and Schult. was subdominant in monoculture (57%). Six complex types of weeds were formed in soybean crops, cereal-annual-dicotyledonous-root-sprouting and dicotyledonous-cereal-annual-root-sprouting prevailed. For cultivation in crop rotation cereal annual species predominated, and dicotyledonous annuals predominated in monoculture. At the same time, the monoculture had a higher level of weeding than crop rotation, or it was equivalent.* ***Conclusions.*** *The species composition of weeds in soybean crops in fallow-crop-row rotation and monoculture differs significantly, which should be taken into account by the agronomic service of farms when developing methods of their control.*

soybeans; weeds; crop rotation; monoculture

Soybeans (*Glycine max* (L.) Merrill.) is a strategic legume in the food security of Ukraine and around the world, there is an extremely important source of vegetable protein and oil, it is the main protein ingredient in mixed fodders production, a powerful biological nitrogen fixer, stabilizing factor under modern farming systems [1].

Modern intensive soybean varieties, with the development and improvement of adaptive technologies for their cultivation, are able to form consistently high yields of quality seeds [2]. One of the obstacles to high crop yields is weeds, as soybeans have

low competitiveness against them, which reduces its productivity by 2.0—2.5 times. The greatest damage to soybean agrocenosis is caused by weeds that germinate before the emergence of crops, along with them and during the 20—30 days of the growing season. The herbacritical period occurs on the 20th—30th day of the growing season, and ends on the 50th day. Therefore, soybean crops should be cleared of weeds for the first 30 days after germination. Destruction of weeds at a later date does not compensate for the losses caused to the crop [3].

The level of reduction in soybean yields largely depends on the species composition of weeds, their harmfulness and is determined by moisture conditions, predecessor, potential weediness of arable layer, sowing methods, early maturity, plant density, crop care methods, cultivation area. Therefore, in order to develop highly effective measures to protect soybeans against weeds, it is necessary to clearly know the species composition of weeds in each specific agrocenosis [4—6].

In the agrophytocenoses of soybeans of the Eastern Forest-Steppe of Ukraine at the first stages of organogenesis a mixed type of weeds is formed with a predominance of annual monocotyledonous and dicotyledonous weeds (90.6%). The ratio between them is close to 1 : 1. Among annual cereal weeds, *Echinochloa crus-galli* (L.) Roem. et Schult. and *Setaria glauca* (L.) Beauv. and among dicotyledonous weeds, *Chenopodium album* L., and *Amaranthus retroflexus* L. predominate in soybean crops. Also *Cirsium arvense* (L.) Scop., *Sonchus arvensis* L., *Convolvulus arvensis* L., *Elytrigia repens* (L.) Nevski, *Fallopia convolvulus* (L.) A. Love, *Galium aparine* L., *Capsella bursa-pastoris* (L.) Medik., *Portulaca oleracea* L., *Thlaspi arvense* L., *Poa bulbosa* L. present in crops. The most significant decrease in yield under the influence of weeds in soybean crops was observed when weeds were 10 piece/m^2. Yield loss ranged from 28.3 to 34.1% compared to control. A further increase in weed level to 30 piece/m^2 reduced seed yield to 40.3—48.2% [6].

The results of VM Zherebka research have shown that, the greatest shortage of soybean yields was due to the dicotyledonous type of weed, while monocotyledonous weed species suppressed soybean plants less. Soybean yields began to decline significantly in the presence of 10 cereals or 5 dicotyledonous weeds per 1 m^2, with yield reductions of 10.5% and 12.3%, respectively. With higher weed densities and mixed weeds, the reduction in soybean yields was to 41.5% [7].

At the research sites of the Vinnytsia State Agricultural Research Station, 14 species of weeds were found in soybean crops after winter wheat as a forecrop: *S. glauca*, *E. crus-galli*, *E. repens*, *A. retroflexus*, *C. album*, *C. bursa-pastoris*, *Barbarea vulgaris* R. Br., *S. arvensis*, *C. arvensis*, *T. arvense*, *Stellaria media* (L.) Vill., *G. aparine*, *Euphorbia virgata* Waldst. et Kit., *Polygonum aviculare* L. [8—9].

Studies conducted at the Chabany Research Farm of the NSC of the Institute of Agriculture of the National Academy of Sciences of Ukraine have shown that, 17 species of weeds in soybean crops after winter wheat as a forecrop in a fixed seven-course stationary, crop rotation were. Among annual cereals, *E. crus-galli* and *S. glauca*, and among dicotyledonous, *Raphanus raphanistrum* L., *C. album*, *A. retroflexus* predominate. Perennial species *S. arvensis, C. arvense*, and *E. repens* are represented, and *C. arvensis* occurs in small quantities [10].

In the conditions of sufficient moisture of the Right-Bank Forest-Steppe of Ukraine, 65 species of weeds of different biological groups weed were. Dominant among them are 42 species. The most common species of weeds that are most similar in agrobiological characteristics to the culture (*S. glauca*, *E. crus-galli*, *C. album*, *A. retroflexus*, *Galinsoga parviflora* Cav., *C. bursa-pastoris*, *T. arvense*, *Polygonum scabrum* Moench, *Matricaria perforata* Merat). Perennial species in the agrophytocenosis occupy 1.8%, but *C. arvense*, *C. arvensis* and *E. repens* are the most harmful, due to their resistance to agronomic and chemical measures of population control. They appear mainly in the second half of the growing season. Loss of soybean yield from weeds in the zone set 30—80% of the potential [11].

According to VP Borony and co-authors in the experimental farm «Bokhonytske» of the Institute of Forage of NAAS dominant contaminants of soybean crops after grain ear predecessors (winter wheat, spring barley) were annual weeds. The number of annual cereals and dicotyledonous species was 58—65% and 42—35%, respectively. Cereal species were presented *S. glauca* and *E. crus-galli*. Dicotyledonous weeds predominated *C. album* and *Matricaria inodora* L. The number was smaller to *T. arvense*, *G. parviflora*, and *A. retroflexus*. Isolated specimens among perennial weeds, *C. arvense* and *C. arvensis* were found [4].

According to IM Storchous research, in the conditions of the Central Forest-Steppe of Ukraine six species of different biological groups of weeds were dominated in soybean crops. Weed type was mixed. The most common species of segetal vegetation were *A. retroflexus*, *C. album*, *G. parviflora*, *C. arvense*, *Sonhus asper* (L.) Hill, *C. arvensis* [5].

SI Sorokina and co-authors testify that the main contaminants of soybean crops are *A. retroflexus* and *C. album*. In addition, there are several species of annual and perennial dicotyledonous and monocotyledonous weeds: *C. arvensis*, *Taraxacum officinale* Web. et Wigg, *S. arvensis*, *P. oleracea*, *E. crus-galli*, *E. repens* [12].

The results of research VS Zadorozhny and co-authors have shown that the most common weeds in soybean crops are *S. glauca* and *C. album*. Already in the presence of 1—5 plants *S. glauca* seed yield decreases by 2.2—9.8%. As the density of this weed increases to 10—25 pieces/m^2, crop yields decrease by 12.7—20.7%. By number *S. glauca* 50 pieces/m^2 and 100 pieces/m^2 the level of productivity decreases by 33.0% and 51.4%, respectively. In addition, it was found that the density *C. album* of 1—5 pieces/m^2, soybean yield decreases by 3.2—9.7%. In the presence of this weed, 10—25 pieces/m^2 and 50 pieces/m^2 of seed yield losses were 14.7—24.0% and 41.2%, respectively [13].

In the experimental field of Zhytomyr National Agroecological University, soybean crops were characterized by a mixed type of weeds. The dominant species were *C. album*, *Amaranthus albus* L., *C. arvense* and *E. repens* [14].

During the research in the stationary crop rotation of the Laboratory for Breeding and Seed Production of the National University of Life and Environmental Sciences of

Ukraine «Agronomic Research Station» after corn for grain as a forecrop, a mixed type of weeding was observed with a slight predominance of annual dicotyledonous weeds. The species composition, *C. album*, *A. retroflexus*, *Polygonum lapathifolium* L., *Polygonum convolvulus* L., *S. arvensis*, and *C. arvense* prevailed. Annual cereals were presented mainly *S. glauca* and *E. crus-galli*, and the number of perennial weeds (different species of sow thistles, *E. repens*) was insignificant [15].

Recent field studies were conducted at the Institute of Forage and Agriculture of Podillya of NAAS have shown that, in the Right Bank Forest-Steppe of Ukraine soybean crops haved a mixed type of weeds, dicotyledonous weeds predominate over cereals. Crops of perennial dicotyledonous weeds are dominated by: *C. album*, *P. scabrum*, *A. retroflexus*, *G. parviflora*, *Spergula arvensis* L. and *M. inodora*, and among monocotyledons — *S. glauca* and *E. crus-galli*. In addition, perennial weeds are found in crops — *C. arvensis*, *C. arvense* and *E. repens* [16].

The purpose of research is to establish the species composition of weeds and their dominant role, to determine the type and level of weed soybean crops for cultivation in stationary crop rotation and monoculture in the eastern part of the Forest-Steppe of Ukraine.

Methods and conditions of research. The research was conducted during 2011—17 in the nine-field stationary, fallow-grain-row crop rotation of the Department for Plant Production and Cultivar Investigations of the VYa Yurjev Plant Production Institute of NAAS (black fallow — winter wheat — sugar beets — spring cereals — peas for grain — winter wheat — corn for grain ½ + soya ½ — spring cereals — sunflower) and monoculture (soya). In some years, in the crop rotation after sugar beets and soybeans placed research plots of millet. Soil was chernozem typical medium humus slightly leached.

Surveys of soybean crops for weeds in crop rotation and monoculture were conducted simultaneously (in the second half of the growing season) according to the methodology set out in the recommendations «Herbological monitoring of agricultural fields» [17]. A separate form was selected for each field, in which, after the survey, the identified species of weeds or contaminants were entered (mostly field seed windfall). Both dominant and subdominant weed species were considered. The dominant role of each species was assessed approximately based on its share in the formation of the total mass of the segetal group in the field. Dominant were considered to be those species that weighed more than 10% of the total mass of all weeds, and subdominant were considered of 3—10%, respectively.

In determining the type of weed in its name, the group that was most represented in the total mass of weeds was placed first, and the groups of weeds were ranked second or third, according to their participation in the segetal group. The level of weeds in each field was determined by the proportion of weeds in the total mass of agrophytocenosis: up to 1% — very weak; 1—5% — weak; 6—15% — average; 16—45% — strong; over 45% — very strong.

Research and discussion results. Surveys of soybean crops placed in fallow-grain-row crop rotation and monoculture showed that weeds were represented by 16 families: Poaceae — 5 species; Brassicaceae — 2 species; Chenopodiaceae — 1 species; Amaranthaceae — 1 species; Solanaceae — 1 species; Portulacaceae — 1 species; Asteraceae — 9 species; Polygonaceae — 5 species; Lamiaceae — 1 species; Malvaceae — 1 species; Rubiaceae — 1 species; Violaceae — 1 species; Caryophyllaceae — 1 species; Convolvulaceae — 1 species; Euphorbiaceae — 1 species; Fabaceae — 1 species.

In general, segetal vegetation in soybean crops included six agrobiological subgroups: early spring; spring late; wintering; biennials; root sprouts; rhizomatous (rod-rooted). Spring late weeds were dominated, which accounted for 42% of the total number of species.

A total of 33 weeds and contaminants (including field seed fall) were found in soybean crops in crop rotation and monoculture. They were divided into three groups. In particular, the group of spring early and late weeds included 21 species: *S. glauca*, *Setaria viridis* (L.) Beauv., *E. crus-galli*, *Sinapis arvensis* L., *C. album*, *A. retroflexus*, *Solanum nigrum* L., *P. oleracea*, *Ambrosia artemisiifolia* L., *P. lapathifolium*, *Stachys annua* L., *F. convolvulus*, *Xanthium strumarium* L., *Cyclachaena xanthifolia* (Nutt.) Fresen., *Malva neglecta* Wallr., *P. aviculare*, *Helianthus annua* L., *Panicum miliaceum* L., *Sonchus oleraceus* L., *Zea mays* L. and *Fagopyrum esculentum* Moench.

The group of wintering and biennial weeds was represented by 5 species: *Lactuca serriola* L., *G. aparine*, *T. arvense*, *Viola arvensis* Murr. and *Melandrium album* (Mill.) Garcke. The group of perennial weeds included 7 species: *C. arvense*, *S. arvensis*, *C. arvensis*, *T. officinale*, *E. virgata*, *Rumex crispus* L. and *Trifolium pratense* L.

There are some differences in the species composition of weeds for soybean cultivation in crop rotation and monoculture. According to research in 2011—17, 30 species of weeds and contaminants (spring early and late — 60%, wintering and biennial — 17%, perennial — 23%) were found in soybean crops after winter wheat (crop rotation), and 18 species (spring early and late — 72%, wintering and biennial — 6%, perennial — 22%) after soybeans (monoculture). The species composition of weeds after both predecessors were: *S. glauca*, *E. crus-galli*, *C. album*, *A. retroflexus*, *P. oleracea*, *A. artemisiifolia*, *P. lapathifolium*, *X. strumarium*, *C. xanthifolia*, *C. arvense*, *S. arvensis*, *C. arvensis*, *E. virgata* and *P. miliaceum*. Note that the latter species may have grown in a monoculture next to its subspecies *Panicum miliaceum var. ruderale* Kitag., they are quite difficult to distinguish because they are morphologically similar.

Compared to crop rotation, no soybeans were found in monoculture *S. viridis*, *S. nigrum*, *S. annua*, *F. convolvulus*, *M. neglecta*, *P. aviculare*, *S. oleraceus*, *G. aparine*, *T. arvense*, *V. arvensis*, *M. album*, *R. crispus*, *T. pratense* and *Z. mays*. Compared with monoculture, soybean crop rotation was not detected *S. arvensis*, *H. annua* and *F. esculentum*.

According to the generalized data of our seven-year research (Table 1), the main weed species in soybean crops in crop rotation and monoculture accounted for 33% of the total species composition of weeds, respectively. Annually for growing soybeans in crop rotation *S. glauca*, *E. crus-galli*, *C. album*, *S. nigrum*, *P. lapathifolium* and *C. arvense*, and in monoculture *E. crus-galli* and *A. artemisiifolia* were present. However, in the monoculture were less *S. glauca* (43%), *A. retroflexus* and

S. arvensis (57%), *P. lapathifolium* (71%), *C. arvensis* (42%), and in crop rotation were *A. artemisiifolia* (43%), *X. strumarium* (57%). Among the main weeds, the largest share of dominance is recorded in *X. strumarium* in monoculture (43%), and subdominance — *S. glauca* in crop rotation (57%) and *E. crus-galli* in monoculture (57%).

It was found that during this period, soybean crops formed a total of six complex types of weeds, of which two predominated: cereal-annual-dicotyledonous-root-sprouting and dicotyledonous-cereal-annual-root-sprouting. The type of weediness of soybean crops in crop rotation differed from the type of weediness in monoculture, except in 2014—16, when the same types of weediness were formed. In crop rotation conditions, the crops were mostly dominated by cereal annual species, and monocultures — dicotyledonous annual species. Root-sprouting weeds were the least represented in soybean crops (Table 2).

During the years of research, the level of weed infestation in soybean crops, both in crop rotation and in monoculture, varied from very weak to strong. For the most part, there was no difference in weed level between soybean crops in crop rotation and monoculture, or there was a higher level of weed infestation in monoculture than in crop rotation (Table 3).

CONCLUSIONS

Under conditions of the eastern part of the Forest-Steppe of Ukraine, a total of 33 species of weeds and contaminants belonging to 16 families were found in soybean crops. The aster family (9 species) was the most represented. The second place was taken by thin-legged and buckwheat (5 species each).

During the cultivation of soybeans after winter wheat in crop rotation, 30 species of weeds (spring early and late were 60%, winter and biennial were 17%, perennial were 23%), and in monoculture, 18 species (spring early and late were 72%, wintering and biennial were 6%, perennial were 22 %) were found. The main weeds in soybean crops in crop rotation *S. glauca*, *E. crus-galli*, *C. album*, *S. nigrum*, *P. lapathifolium*, *P. miliaceum*, *C. arvense*, *S. arvensis* and *C. arvensis*, and in monoculture, *E. crus-galli*, *C. album*, *A. artemisiifolia*, *X. strumarium,* and *P. miliaceum* were. The largest share of dominance is recorded in *X. strumarium* in monoculture (43%), and subdominance — *S. glauca* in crop rotation (57%) and *E. crus-galli* in monoculture (57%).

In general, six complex types of weeds were formed in the crops, of which the cereal-annual-dicotyledonous-root-sprouting and dicotyledonous-cereal-annual-root-sprouting prevailed. During soybean cultivation in crop rotation was dominated by cereals annual, and monoculture by dicotyledonous annual. In most cases, monoculture had a higher level of weeding than crop rotation, or equivalent.

Thus, the species composition of

1. Species composition of the main weeds in soybean crops for cultivation in crop rotation and monoculture, 2011—17

Weed species	Share of weed infestation and dominance in segetal group,%			
	d	s	a	Σ
Fallow-grain-row crop rotation (winter wheat as a forecrop)				
Setaria glauca (L.) Beauv.	14	57	29	100
Echinochloa crus-galli (L.) Roem. et Schult.	29	29	42	100
Chenopodium album L.	29	14	57	100
Amaranthus retroflexus L.	–	–	71	71
Solanum nigrum L.	–	–	100	100
Polygonum lapathifolium L.	–	29	71	100
Panicum miliaceum var. ruderale Kitag.	–	14	57	71
Cirsium arvense (L.) Scop.	29	29	42	100
Sonchus arvensis L.	–	–	71	71
Convolvulus arvensis L.	–	–	71	71
Monoculture (soybean as a forecrop)				
Echinochloa crus-galli (L.) Roem. et Schult.	–	57	43	100
Chenopodium album L.	–	–	86	86
Ambrosia artemisiifolia L.	29	14	57	100
Xanthium strumarium L.	43	14	29	86
Panicum miliaceum var. ruderale Kitag.	–	–	86	86
Cirsium arvense (L.) Scop.	–	29	57	86

Note: d — dominant species; s — subdominant species;
a — assectators (related species);
Σ — occurrence of the species (sum d, c, a);
«–» — the species did not have a dominant influence

2. Type of weed infestation of crops for cultivation in crop rotation and monoculture

Year of research	Fallow-grain-row crop rotation (winter wheat as a forecrop)	Monoculture (soybeans as forecrop)
2011	Cereal-annual-root-sprouting	Dicotyledonous-cereal-annual
2012	Cereal-annual-dicotyledonous-root-sprouting	Cereal-annual-dicotyledonous
2013	Cereal-annual-dicotyledonous-root-sprouting	Dicotyledonous-cereal-annual-root-sprouting
2014	Dicotyledonous-cereal-annual-root-sprouting	–//–
2015	Cereal-annual-dicotyledonous-root-sprouting	Cereal-annual-dicotyledonous-root-sprouting
2016	Dicotyledonous-cereal-annual-root-sprouting	Dicotyledonous-cereal-annual-root-sprouting
2017	Dicotyledonous-root-sprout-cereal-annual	–//–

3. The level of weediness of soybean crops for cultivation in crop rotation and monoculture

Year of research	Fallow-grain-row crop rotation (winter wheat as a forecrop)	Monoculture (soybeans as forecrop)
2011	Weak	Very weak
2012	Weak	Weak
2013	Very weak	Strong
2014	Weak	Average
2015	Very weak	Weak
2016	Average	Average
2017	Strong	Strong

weeds in soybean crops in crop rotation and monoculture differs significantly, which should be taken into account when developing methods of their control. In the future, it is necessary to study the effect of fertilizer systems on weediness of soybean crops in the conditions of fallow-grain-row crop rotation.

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Залежність забур'яненості посівів сої від умов вирощування у Східному Лісостепу України

Мета. *Встановити видовий склад бур'янових рослин, їх домінантну роль та визначити тип і рівень забур'яненості посівів сої за вирощування в стаціонарній дев'ятипільній паро-зерно-просапній сівозміні та монокультурі в умовах східної частини Лісостепу України.* **Методи.** *Дослідження проводили шляхом маршрутних обстежень у польових дослідах.* **Результати.** *За даними досліджень 2011—2017 рр., у стаціонарній сівозміні на посівах сої після попередника пшениця озима виявлено 30 видів бур'янів і засмічувачів (ярих ранніх і пізніх — 60%, зимуючих і дворічних — 17%, багаторічних — 23%), а за вирощування в монокультурі — 18 видів (ярих ранніх і пізніх — 72%, зимуючих і дворічних — 6%, багаторічних — 22%). Вони належали до 16-ти родин, з яких найбільшою мірою були представлені родини Asteraceae (9 видів), Poaceae (5 видів) та Polygonaceae (5 видів). Основними видами бур'янів у посівах сої в сівозміні та монокультурі були Echinochloa crus-galli (L.) Roem. et Schult., Chenopodium album L., Cirsium arvense (L.) Scop. та Panicum miliaceum L. Крім зазначених бур'янів за вирощування сої в сівозміні були присутні Setaria glauca (L.) Beauv., Amaranthus retroflexus L., Solanum nigrum L., Polygonum lapathifolium L., Sonchus arvensis L., Convolvulus arvensis L., а в монокультурі — Ambrosia artemisiifolia L., Xanthium strumarium L. Найбільшою мірою в монокультурі домінувала Xanthium strumarium L. (43%), а субдомінували Setaria glauca (L.) Beauv. — в сівозміні (57%) та Echinochloa crus-galli (L.) Roem. et Schult. — в монокультурі (57%). У посівах сої формувалось шість складних типів забур'яненості, з яких переважали злаководводольно-дводольномалорічно-коренепаростковий та дводольномалорічно-злаководводольно-коренепаростковий. За вирощування в сівозміні переважали злакові однорічні види, а в монокультурі — дводольні малорічні. При цьому в монокультурі спостерігався вищий рівень забур'яненості, ніж у сівозміні, або він був рівнозначним.* **Висновки.** *Видовий склад бур'янових рослин на посівах сої в паро-зерно-просапній сівозміні та монокультурі значно відрізняється, що слід враховувати агрономічній службі господарств за розробки способів їх контролювання.*

соя; бур'яни; сівозміна; монокультура

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Зависимость засоренности посевов сои от условий выращивания в Восточной Лесостепи Украины

Цель. *Установить видовой состав сорных растений, их доминантную роль и определить тип и уровень засоренности посевов сои при выращивании в стационарном девяти-польном паро-зерно-пропашном севообороте и монокультуре в условиях восточной части Лесостепи Украины.* **Методы.** *Исследования проводили путем маршрутных обследований в полевых опытах.* **Результаты**. *По данным исследований 2011—2017 гг., на посевах сои в стационарном севообороте после предшественника пшеница озимая выявлено 30 видов сорняков и засорителей (ярых ранних и поздних — 60%, зимующих и двулетних — 17%, многолетних — 23%), а при выращивании в монокультуре — 18 видов (ярых ранних и поздних — 72%, зимующих и двулетних — 6, многолетних — 22%). Они принадлежали к 16-ти семействам, из которых в наибольшей мере были представлены семейства Asteraceae (9 видов), Poaceae (5 видов) и Polygonaceae (5 видов). Основными видами сорняков на посевах сои в севообороте и монокультуре были Echinochloa crus-galli (L.) Roem. et Schult., Chenopodium album L., Cirsium arvense (L.) Scop. и Panicum miliaceum L. Кроме указанных сорняков при выращивании сои в севообороте присутствовали Setaria glauca (L.) Beauv., Amaranthus retroflexus L., Solanum nigrum L.,*

Polygonum lapathifolium L., Sonchus arvensis L., Convolvulus arvensis L., а в монокультуре — Ambrosia artemisiifolia L., Xanthium strumarium L. В наибольшей степени в монокультуре доминировал Xanthium strumarium L. (43%), а субдоминировали Setaria glauca (L.) Beauv. — в севообороте (57%) и Echinochloa crus-galli (L.) Roem. et Schult. — в монокультуре (57%). В посевах сои формировалось шесть сложных типов засоренности, из которых преобладали злаковооднолетне-двудольномалолетне-корнеотпрысковый и двудольномалолетне-злаковооднолетне-корнеотпрысковый. При выращивании в севообороте преобладали злаковые однолетние виды, а в монокультуре — двудольные малолетние. При этом в монокультуре наблюдался высший уровень засоренности, чем в севообороте, или он был равнозначным. **Выводы.** *Видовой состав сорных растений на посевах сои в паро-зерно-пропашном севообороте и монокультуре значительно отличается, что следует учитывать агрономической службе хозяйств при разработке способов их контролирования.*

соя; сорняки; севооборот; монокультура

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