

# **Influence of Extracts of *Ambrosia artemisiifolia* L. on Laboratory Viability of Seeds of Various Cultures**

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The paper presents the results of researches on studying of influence of processing of seeds of agricultural croppers by extracts of aerial portion of *Ambrosia artemisiifolia* L. and from roots of weeds on germination. Allelopathic inhibitory effect of extracts on ability of seeds of cultures to germination is established.

**Keywords:** *Ambrosia artemisiifolia* L., extract, seeds, germination.

**Introduction.** For studying of allelopathic interactions of cenosis, and especially agrocenosis nowadays it is given more and more attention. However, it should be noted that studies on the establishment of the physiological aspects of the influence of substances inhibiting weeds on cultivated plants not so much. This is due to the complexity of the processes which react of plants to physiologically active substances of their competitors for power factors [1, 2, 3, 4].

Some researchers argue that the similarity of grain crops processing by extracts from plants of *Ambrosia artemisiifolia* L. decreases by 78.7% compared with the control. Foreign researchers suggest that acetone and alcohol extracts reduce germination of seeds of pea, soybean, sunflower and maize by 20–50% [6]. Therefore researches were devoted to studying allelopathic interactions between *Ambrosia artemisiifolia* L. and cultural plants.

**Materials and technique of researches.** Experiments were carried out during 2004–2007 at the Sumy National Agrarian University. In laboratory environment studied allelopathic effect of water extracts of *Ambrosia artemisiifolia* L., wetting seeds of crops in root and stalk extracts, and in control options used usual water. Seeds couched in ditches on filter paper in standard conditions for

each of studied cultures (STATE STANDART OF UKRAINE (SS of Ukraine) 2240-93). Frequency of experience was fivefold. To avoid mistakes in carrying out this experiment, for obtaining water extracts from stalks and root system we selected *Ambrosia artemisiifolia L.* plants typical for this variety and such which have an average degree of development. For extraction used a batch. of 20 plants.

**Results of researches.** Results of researches testify that root allocations of *Ambrosia artemisiifolia L.* have much greater depressing effect on germination of seeds of agricultural plants, than extracts of stem mass. Thus, on average, in four years maximum reduction of seed germination was found at pea and vetch spring. Seeds of these cultures, when processing it by extract from root system of weeds, sprouted only for 26 and 46% respectively. Germination of seeds of millet, sugar beet and coriander was slightly higher and made 60–64% (Table 1). Seeds of such cultures as, winter wheat and oats, showed the maximum resistance to effect of extract from rhizomes of *Ambrosia artemisiifolia L.* and sprouted for 72–74%.

Table 1

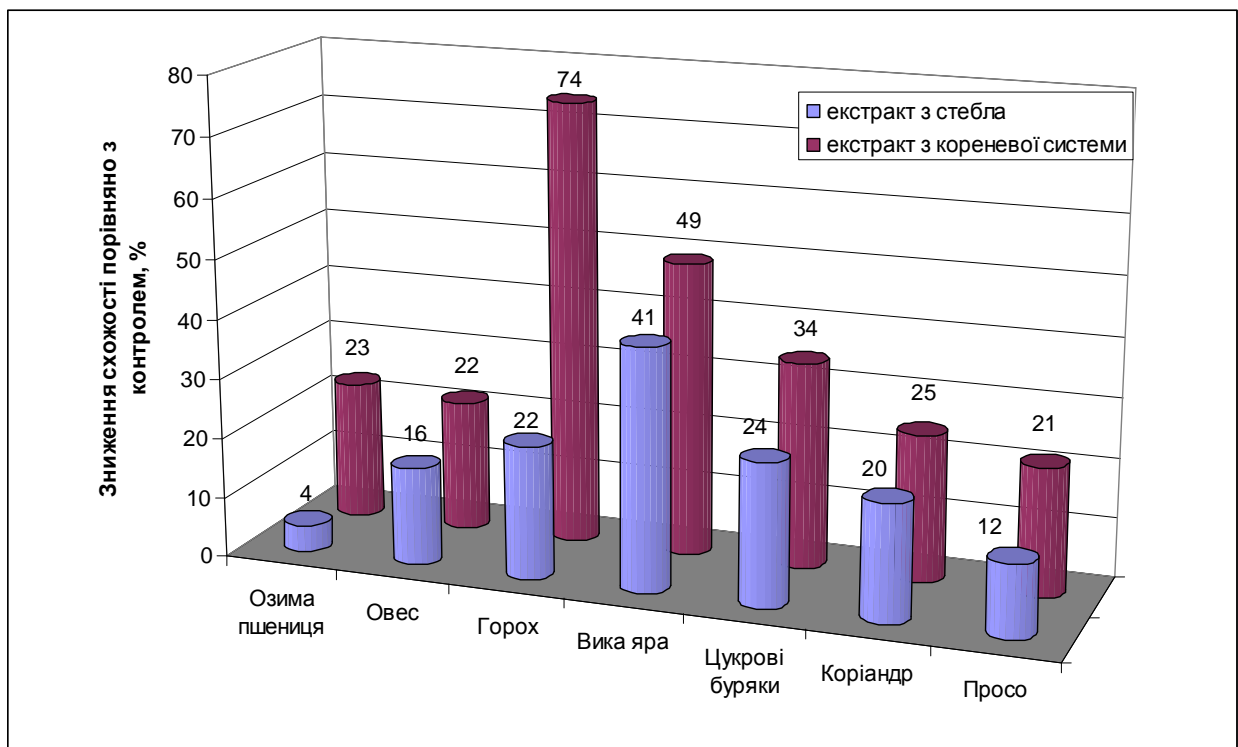
**Influence of extracts of root system and caulis mass of *Ambrosia artemisiifolia L.* on germination of seeds of croppers, (2004–2007)**

Croppers	Seed germination, %		
	not treated (control)	treated with extract of stalk	treated with an extract of the root system
Winter wheat	96	86	74
Oats	92	77	72
Pea	99	77	26
Vetch	90	54	46
Sugar beet	94	72	62
Coriander	79	64	60
Millet	82	72	64
HIP <sub>0,05</sub>	10,9		

In variant with processing of seeds of extract of terraneous part of *Ambrosia artemisiifolia L.* minimum was germinations of seeds of vetch and coriander – 54 and 64% respectively. Germination of seeds of oats, peas, millet and sugar beet lay

within 72–77%. Reaction of wheat seeds to processing by extract from terraneous part was minimum in the experiment and the percent of its germination was 86%.

In general, cultures differently reacted to treatment by extracts of their seeds, but there are several features that should be noted. The minimum difference between control and options, processed by extracts from terraneous part of *Ambrosia artemisiifolia L.* plants was for seeds of winter wheat (4%), oats (16%) and millet (12%). The negative influence of discharges from terraneous mass and roots on seed germination of oats and millet was slightly less. In this case this indicator was at the level of 21–22%. And for winter wheat influence of extracts from terraneous parts of *Ambrosia artemisiifolia L.* was insignificant, that is such that doesn't exceed significantly the smallest essential difference (fig. 1).



**Fig. 1. Decrease in viability of seeds of cultures depending on processing by extract of *Ambrosia artemisiifolia L.*, % in comparison with control, (2004–2007)**

Decrease germination of seeds of cultural plants happens depending on viability of seeds on control, but comparison with conditions of formation of seeds

doesn't allow to tell about the clear tendency. In our opinion the main role played pre-sowing seed treatment, clearing, finishing to standard and calibration. Due to this differences are graded (within error) between years in which it was grown up a seed material. At the same time many researchers argue that the negative influence of extracts of *Ambrosia artemisiifolia* L. on viability of seeds of crops is amplified for seeds formed in the bad years of cultivation.

**Conclusions.** Extracts from plants of *Ambrosia artemisiifolia* L negatively influence germination of seeds of many cultural plants. At the same time, extract of root allocations of *Ambrosia artemisiifolia* L strongly inhibits germination of seeds of cultural plants, than extract from terraneous mass. Maximum negative influence was established for germination of seeds of vetch and peas. For these crops the indicator of decrease of laboratory seed germination was 49 and 74% respectively.

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# **ВПЛИВ ЕКСТРАКТІВ З АМБРОЗІЇ ПОЛИНОЛИСТОЇ НА ЛАБОРАТОРНУ СХОЖІСТЬ НАСІННЯ РІЗНИХ КУЛЬТУР**

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Наведено результати досліджень з вивчення впливу обробки насіння сільськогосподарських культур екстрактами з наземної частини амброзії полинолистої та із коренів бур'яну на проростання. Встановлено пригнічуючу алелопатичну дію екстрактів на здатність насіння культур до проростання.

*Ключові слова:* амброзія полинолиста, екстракт, насіння, проростання.

## **Влияние экстрактов из амброзии полыннолистной на лабораторную всхожесть семян разных культур**

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Приведены результаты опытов по изучению влияния обработки семян сельскохозяйственных культур экстрактами из наземной части и корней амброзии полыннолистной на их прорастание. Установлено угнетающее алелопатическое действие на способность семян культур к прорастанию.

*Ключевые слова:* амброзия полыннолистная, экстракт, семена, прорастание.