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ACHIEVEMENTS AND PROBLEMS IN THE WEED CONTROL IN BARLEY (*Hordeum vulgare* L.)

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Abstract

Stated in the literature review gives an idea that many issues are published contrasting views due primarily to the different conditions under which they have conducted experiments and the biological particularities of barley. A serious problem is a resistance and compensatory processes in the weeds. Many authors exported data, which indicate that the barley is different from the common wheat in reaction to some of herbicides, herbicide combinations and reservoir herbicidal mixtures. In the literature there is growing consensus, that periodically have to be make a new mapping of crops and to seek new solutions to chemical control with the changing weed associations.

Key words: *barley, herbicides, weed, yield.*

REVIEW

In recent years, the areas occupied by barley tend to decrease, caused by a series of economic, climatic and other factors. Retaining high and stable yields of barley required optimization all of processes in the technology of cultivation and consideration of climate changes. An important stage in the technology for growing is a crop protection and particular the fight against the weeds. Properly and timely destruction of the weeds guaranteed obtaining high yields of this crop.

Registered in Bulgaria a large number of herbicides in cereals with a different spectrum of activity and changes in weed infestation requires a study of the problem of the efficiency of the herbicides and herbicide combinations, and the sensitivity of the crop to them as well as to propose a cost-effective and efficient scheme for chemical contol of weeds under certain conditions. (Georgiev 2015).

In Bulgaria barley are weeding of approximately 160 weed species, of which 80 are permanent. Distributed by biological groups, they are in the following order: ephemera - 18; early-springs - 26; winter-springs and winter - 30 perennials - 9 species (Kolev, 1963; Andreeva -Fetvadzhieva and Dechkov, 1973; Tityanov, 2006).

Saldzhiev (2002) reported a decrease in yield in the experimental areas of barley by 20.9% to 58.3% depending on the degree of weed infestation. The negative impact of individual species weed in cereals is determined by the combination of its features: period of germination, growth rate, size of the overhead mass, height and branching of stems, shape, size and position of leaves, levels of photosynthetic activity ecological plasticity coefficient of reproduction and others (Haigh, 2000).

In Australia, the yield of barley redused by 30%-50% when rhe density of wild oats exceed 100 plants per m^2 (Chancellor and Peters, 1976)

According to several authors (Tityanov, 2006; Chhokar et al., 2008; Scursoni et al., 2011) wild oats is economically the most important weed in winter cereals including barley both in Bulgaria and around the world

According to Bell and Nalewaja (1968) multiplication of wild oats in barley, the yield is decreased by 6.5% at a rate of 70 plants per m^2 and 25.9% in density 160 plants per m^2.

In the cultivation of winter barley crop rotation unit corn-barley deep soil and sowing treatments against corn leads to a significant reduction in specific winter cereal weeds: annual dicotyledonous (*Lithospermum arvense* L., *Galium tricorne* Whit., *Anthemis arvensis*

L.) and annual monocotyledonous (*Alopecurus myosuroides.* Huds., *Avena fatua L.).* In the continued cultivation of winter barley behind after wheat, the dynamics of weed infestation depends on the continued use of herbicides from the same group when are manifested compensation processes (Atanasova and Zarkov, 2007) Similar results obtained and (Bazitov and Bazitov, 2011) in barley in super intensive crop rotation.

Bazitov et al. (2014) reported a significant increase in weed infestation in experimental areas of barley grown under irrigation.

O'Donovan et al. (2001) in field trial found that barley seeded with 25-50% higher sowing rate strongly inhibited seed formation in wild oats.

Using chemical means to weed contorl weeds in the production of barley in modern agriculture is a very important. The herbicides are the main factor in modern integrated technologies for weed control. Obtaining high yields of barley is unthinkable without their use.

According to Galla (1989) the using of herbicides in crops of barley free of weeds reduces the yield, when the weed infestation is intense - efficiency is high, and the yield can be increased to 64% (Benkov Pochekanska, 1990)

Gruzdev et al. (1989) found an increase in the yield of barley by 15% to 39% when the using modern herbicides.

The results of experiments in barley by the use of reduced doses of herbicides are indicative. It has been found that with increased seed sowing standards and the use of low doses of herbicides are effective strategy for the control of grass weeds in Australia (Wallker et al. 1998).

The herbicide Axial (pinoxaden) has high efficacy against grass weeds and good selectivity to barley (Campagna and Rueegg, 2006)

Sikkema et al. (2008) tested the tolerance of springs wheat, barley and oats to herbicide developed by BASF *saflufenatsil* for weed control in the corn. The data from the experiment showed good tolerance of the crop to the herbicide when it is applied after sowing and before emergence of the crop. Applications vegetation saflufenatsil leads to a decrease in the yield in the three crops.

There have been manifested resistance to pinoxaden forms of wintering wild oat (Avena ludoviciana L.) (Uludag et al., 2008; Sasanfar et al. 2009) and Polish foxtail (Alopecurus myosuroides Huds.) (Henriet and Marechal, 2009; Petit et al. 2010; Delye, 2011).

In a study conducted by Russian scientists establish some sensitivity to certain varieties of barley to fenoxaprop-P-ethyl (Ilyin et al. 2007).

Chhokar et al. (2008), Ellis (2009), Yadav et al. (2009), Dhawan et al. (2010) and Dixit et al. (2011), tested a *pinoxaden* against grass weeds in barley. The results show that it is a perspective herbicide which can control weeds in crop successfully thereof.

In the barley the herbicides must be applied at some point in their development. Crops have specific enzymes responsible for the rapid elimination of herbicide impact of imported products. These enzymes are most active at a particular stage of plant development. This phase is barley is a tillering, through in this phase, the plants are most stable against chemical influences. Treatment in earlier or later stages of crop development, the enzymatic activity is not so high and plants are inhibited by the impact of the herbicide. (Murzagaliev, 2007)

The use of herbicides to destroy unwanted vegetation in crops is a major factor for increasing productivity (Georgiev, 2015).

The relationship herbicides - barley`s yield is not always stable and many authors give divergent results. Spasov and Spassova (1995) reported that preparations based on 2,4-D applied in phase second leaf acting positively on the yield of grain cereals. Late treatment of winter cereals including barley with herbicides, the reduction in the yield of the crop is appreciably (Wick, et al, 1987; Mohan et al, 1988; Martin et al, 1988).

In field experiments with treated and whitout herbicides spring barley, Boatman (1992) found increasing grain yield of 0,5 to 1,2 t / ha in the variants where they used chemical means to destroy weeds

Tralkoxydim, studied at different rates than recommended doses against wild oats in barley in the United States shows the following results: the importation of 100; 75 and 50% of

the dose of the herbicide, the barley is not influenced by the negative effect on wild oats. Only lower yields are obtained by depositing 25% of the recommended dose (O` Donnovan et al., 2001)

Semenov and Vasilyev (2010) reported an increase in yield and grain quality in barley to 26% of the variants treated with herbicides from the sulfonylurea group.

Dimov (1974) found that the germination capacity of barley treated in the spring with 2,4-D did not exceed 89%

The use of sulfonylureas have a negative effect under the metabolism of the plants and appreciably to decrease the quality of seeds. (Shneider, 1974; Kravchenko, 1991)

Atanasova (2005) and Atanasova (2007) studying the selectivity of antibroadleaved herbicides in several varieties of barley in optimal and double doses reported that a significant varietal susceptibility. Variation in yields in most varieties is largely determined by the weather conditions during the years of cultivation and to a lesser extent by the treat

Belanovskaya et al. (2006) found, that in the treatment of barley with herbicide glyphosate 10-12 days before harvest, the protein content of grain increased by 0.54%.

CONCLUSIONS

Presented literature review and opinions of cited authors suggest that chemical control is the most efficient method of controlling weeds. Combinations of herbicides are more effective than self-administration in barley. Often when co-administered produces a high synergistic effect on yield. A number of authors export data from which it is clear that the barley differs from ordinary wheat in its response to some herbicides, herbicide combinations and herbicide tank mixes.

Data relating herbicides to effectively control certain weeds in winter cereals are scarce even globally. The serious problem with them is due to their resistance to most anti-cereal herbicides.

The serious problem is an effect of some herbicides used in their predecessors on succeeding crops, which is in direct relation to weather conditions during the degradation.

Stated in the literature review gives an idea that a lot of questions are published opposing views due primarily to the different conditions under which they have conducted experiments and the biological characteristics of the tested varieties. A serious problem emerged resistance and compensatory processes in weeds. In the literature there is growing consensus that periodically have to make a new mapping of crops and to seek new solutions to chemical control with changing weed associations.

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