EXPERIMENTAL RESULTS REGARDING DAMAGING ORGANISMS CONTROL IN SOYBEAN CROPS OF NORTHERN DOBRUDJA

Antonio-Romeo LOMBARDI¹, Lenuta Iuliana EPURE², Gheorghe Valentin ROMAN², Maria TOADER²

e-mail: lombardiagro@gmail.com

Abstract

Research was conducted in the years 2010-2014 on molic aluviosoil of Macin-Smârdan polder, located in Northern Dobrudja. We studied components of soybean growing technology, in particular the means for controlling weeds, diseases and pests. Weeds growth is favored in this area with irrigation and available groundwater and fertile soils. Weeds spectrum is broad, and the most damaging species are Sorghum halepense, Xanthium strumarium, Abutilon theophrasti, Solanum nigrum, Amaranthus retroflexus, Chenopodium album, Cirsium arvense. The tests showed to be more effective application of pre-emergence herbicides Glifos, 3 l/ha or Glyphogan, 3.5 l/ha (glyphosate acide izopropyl amine) and of post-emergence herbicides Pulsar, 1 l/ha (imazamox) + Silwet, 0,1 l/ha (superspreader adjuvant); subsequently it was considered necessary a manual hoeing for eliminating weeds emerged after the treatments. The diseases attack has not brought particular problems; in some years, and especially in conditions of abundant irrigation, they were identified, isolated, white mold attack (Sclerotinia sclerotiorum). Related to pests, frequently occurs red spider mite attack (Tetranychus urticae); for controlling that the best results were obtained with Apollo acaricide, 0,4 l/ha (clofentezin). In some years (2011), found a beet webworm moth attack (Loxostege sticticalis), fighting it was the most effective Cyperguard, 0,1 l/ha (cypermethrin); in 2013 there was an attack of soybean pod borer (Etiella zikenella), which was controlled by spreading Karate Zeon, 0,15 l/ha (lambda-cipermetrin).

Key words: Tulcea County, Macin-Smârdan polder, soybean crop, weeds, pests and diseases control.

MATERIAL AND METHODS

The research consisted of field experiments in Macin-Smârdan polder, an area with continental climate, and molic aluviosoil, under irrigation, in 2010-2014. Experimental years were different in terms of weather, noting that rainwater was supplemented by irrigation. In the first phase studies were conducted on the degree of land weeding on which were placed the experiments with species identification and the specification of most common species. In the same way it proceeded with the identification of insects and conditions causing them and diseases attack. Following these studies, the experimental variants were established which consisted of treatments for controlling identified damaging organisms.

The growing technology applied on the experimental field was that recommended in the area, namely: the previous plant - winter wheat; tillage - plowing after wheat harvesting, diskin in the autumn, working with disc harrow or combinator in spring, before sowing; fertilization – with phosphorous, 85 kg/ha of P₂O₅, under plowing, and 30-80 kg/ha of N, after emergence of soybean, depending on the success of seed inoculation; seeding - the last decade of April, 56 seeds/m², 45 cm/70 cm between rows, seeds of PR93R65 variety the inoculated with

¹ SC LOMBARDI AGRO SRL, Macin, Tulcea County
² University of Agronomic Sciences and Veterinary Medicine of Bucharest
four bottles of Nitratin-soybean; care works – damaging organisms control, depending on the experimental variants; irrigation; harvesting - manually by cutting of plants, and threshing of the grains in the farm.

During vegetation they were made phenological observations and biometric measurements. Also, observations and determinations were performed on experimental variants effectiveness in controlling damaging organisms. At harvest, it was determined seeds yields, which was expressed in kg/ha at humidity of 12%.

RESULTS AND DISCUSSIONS

The weeds and their control

Determinations on weed populations showed the presence of the following common species: dicotyledonous weeds - Chenopodium album (12 plants/m²), Xanthium strumarium (10 plants/m²), Abutilon theophrasti (7 plants/m²), Amaranthus retroflexus (12 plants/m²), Sonchus arvensis (4 plants/m²), Solanum nigrum (6 plants/m²), Convolvulus arvensis (12 plants/m²), Polygonum lapathifolium (28 plants/m²), Cirsium arvense (5 plants/m²); monocotyledonous weeds - Sorghum halepense (56 plants/m²), Setaria viridis (102 plants/m²). Among the less common species are mentioned: Echinochloa crus-galli, Hibiscus trionum and Digitaria sanguinalis.

The results on the effectiveness of herbicides in controlling weeds in 2013 and 2014 years are presented in Tables 1 and 2. From tables resulted that the presence of weeds drastically reduced the soybeans seeds yields, by comparison with the weeding control variant; in the absence of weed control measures, the yields were reduced from 3356-4273 kg/ha to 763-1104 kg/ha, so with 74.2 to 77.3%.

In all cases, tested herbicides or herbicides associations proved effective in weeds controlling. The best results were obtained in both years, by application of a pre-emergence herbicide of glyphosate (Glifos, 3 l/ha or Glyfogan, 3.5 l/ha) and post-emergence of Pulsar, 1 l/ha (imazamox); for these variants, the weed control was conducted at a rate of 82-87% and seeds yields accounted 90.0-94.2% of the control variant.

![Figure 1](Solanum nigrum L., a very damaging weed for soybean harvest quality (Macin Experimental Field, 2014))

![Figure 2](Sorghum halepense (L.) Pers., a perennial weed very commun in soybean fields (Macin Experimental Field, 2014))

**Table 1**

<table>
<thead>
<tr>
<th>No.</th>
<th>Experimental variants</th>
<th>Rate (l/ha)</th>
<th>Weed control (%)</th>
<th>Seeds yields (kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Control</td>
<td>-</td>
<td>-</td>
<td>1.104</td>
</tr>
<tr>
<td>2</td>
<td>Control 3 time weeding</td>
<td>-</td>
<td>100</td>
<td>4.273</td>
</tr>
<tr>
<td>3</td>
<td>Glifos (glyphosate)</td>
<td>preem.</td>
<td>3 l/ha</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pulsar (imazamox)</td>
<td>postem.</td>
<td>1 l/ha</td>
<td>87</td>
</tr>
<tr>
<td>4</td>
<td>Guardian (acetoclor)</td>
<td>preem.</td>
<td>2 l/ha</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>Pulsar (imazamox)</td>
<td>postem.</td>
<td>1 l/ha</td>
<td>2.877</td>
</tr>
<tr>
<td>5</td>
<td>Dual Gold 960 EC (S-metolaclor)</td>
<td>preem.</td>
<td>1 l/ha</td>
<td>42</td>
</tr>
<tr>
<td>6</td>
<td>Dual Gold 960 EC (S-metolaclor)</td>
<td>preem.</td>
<td>1 l/ha</td>
<td>82</td>
</tr>
</tbody>
</table>
addition, the farm does not grow sunflowers and rapeseed is grown on small areas.

**CONCLUSIONS**

In the experimental area, the farmers show a particular interest to soybean crop, which is an important component of asolanements dominated by cereals, contribute to increased soil fertility, and in recent years is sustained by agricultural policies. Weed control is the most important work care of soybean technology. Weed growth is favored by soil fertility, groundwater intake and irrigation conditions. Problem weeds in soybeans are: *Chenopodium album*, *Xanthium strumarium*, *Abutilon theophrasti*, *Amaranthus retroflexus*, *Sonchus arvensis*, *Solanum nigrum*, *Convulvulus arvensis*, *Polygonum lapatifolium*, *Cirsium arvense*, *Sorghum halepense*, *Setaria viridis*.

The most effective weed control was managing by pre-emergence herbicides based on glyphosate (*Glifos, 3.0 l/ha sau Glyfogan, 3.5 l/ha*) and apply of postemergence imazamox (*Pulsar 1 ha*) associated with Silwet 0.15 l/ha. It was subsequently required manual weeding to remove weeds emerged after herbicide application.

In all the years it was reported attack by insects, most commonly was red spider mite (*Tetranychus urticae*), for whom the most effective control was the treatment with acarcide Apollo, 0.4 l/ha (clofentexin).

![Figure 3 Soybean crop in Macin-Smardan polder](image-url)

In one of the 4 experimental years was reported beet webworm moth attack (*Loxostege sticticalis*), which was controlled by treatment with Cyperguard, 0.1 l/ha (cypermethrin), and in another year a soybean pod borer attack (*Etiella zikenella*), which was countered with Karate Zeon, 0.15 l/ha (lambda-cypermethrin).

In the experimental plots were not observed attack symptoms of disease requiring intervention with fungicides. In certain years, given an
abundant irrigation were reported isolated symptoms of the white mold attack (Sclerotinia sclerotiorum).

REFERENCES


