Technological sequences for weed control in grain sorghum crops
– NARDI FUNDULEA-

Gheorghe MĂTURARU, Mihaela CERGAN, Elena PARTAL, Marius BORDEI
NATIONAL AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE FUNDULEA, CĂLĂRAŞI, ROMANIA
E-mail: erbicide.incda@yahoo.com

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INTRODUCTION

Sorghum (Sorghum) is a genus of plants in the Poaceae family. In Romania, average grain sorghum yields ranged between 1.5-5.6 t/ha, being successfully cultivated in the West and Northwest, in the South and Southeast, in southern Moldova and in some areas of Transylvania. Sorghum has high temperature requirements, with the minimum germination temperature being 10-12 degrees celsius, and temperatures favorable for growth being above 20 degrees celsius. As precursor plants, weeding crops are preferred, which leave the land clean, and after sorghum, it is recommended to establish crops only in the spring of the following year.
The presence of weeds in the crop is a reality, their predominance being influenced by the crop area, technological links, the preceding plant and local pedoclimatic conditions.
The research focused on technological sequences (classical technology, imazamox-resistant technology and nicosulfuron-resistant technology), crop selectivity and combating weed species by applying herbicide treatments without negative impact on the environment.

MATERIALS AND METHODS

The research was carried out in the period 2025, at the National Institute for Agricultural Research and Development - Fundulea, being studied the technological sequences (classical technology, imazamox-resistant technology and nicosulfuron-resistant technology),crop selectivity and combating weed species by applying herbicide treatments. The experiment being located on a soil of cambic chernozem type (3.2% organic matter, 37% clay, 6.5 pH), using different hybrids F135, Sentine and Zealanda. In the pedoclimatic conditions specific to the area at NARDI- FUNDULEA, the sorghum crop presents a high infestation (88%), a spectrum of characteristic weeds and a dominance specific to the area.
The organization of the experiment was done according to the method of randomized blocks, with a plot area of 1000 mp, in 3 replications, the amount of water used was 300 l/hectare. The sowing density was 300 thousand grains/hectare, with the distance between rows of 70 cm. The herbicides used as well as the experimental variants are described in the table 1 and technical data in the table 2 below:

Nr. var.	Herbicide treatments	Dose kg,l/ha	Time of aplication
1	Untrated control	-	-
2	Dicopur Top classical technology	1.0 l/ha	postem BBCH 14-16
3	PULSAR imazamox-resistant technology	1.2 l/ha	Postem BBCH 14-16
4	Diniro +Trend nicosulfuron-resistant technology	0.5 kg/ha +0.25 l/ha	postem BBCH 14-16

- Placement of the experience: randomized blocks
- Plot area - 1000 m²
- Solution: 300 l/ha

Observations:

- Selectivity (%): 7-14-21 days after treatment,

Efficacy (%): 21 days after treatment

Fig. 4The efficacy (%) of the herbicide Diniro +Adj.

Type of soil	cambic chernozem (3.2% organic matter, 37% clay, 6.5 pH)
The preceding plant	Wheat
Mechanical works	Plow 20-25 cm Discussed Combinator
Hybrid	classical technology-F135 imazamox-resistant technology-Sentine nicosulfuron-resistant technology-Zealanda
Date of sowing	April.24.2025
Sunrise date	May. 19.2025
Date of treatments	classical technology- imazamox-resistant technology- nicosulfuron-resistant technology
Fertilizers	100kg/ha urea

Table 2. TECHNICAL DATA

RESULTS AND DISCUSSIONS

In the Sorghum (Sorghum) experience carried out in the experimental field at the NARDI - Fundulea, the crop showed a high infestation degree of -88% - weeds, extremely diversified, depending on the local pedoclimatic conditions of the years of research -2025. The most representative (fig. 1) weed species were annual dicotyledons: *Setaria viridis,Echinochloa crus-galli,Sorghum halepense,Amaranthus retroflexus,Chenopodium album,Xanthium strumarium and Cirsium arvense.The* efficacy of herbicide treatments applied to controll weed species is presented in Fig.2 - Fig.5.
In the crop, following the treatments with herbicides for the technological sequences (**classical technology, imazamox-resistant technology and nicosulfuron-resistant technology** applied, postemergence (BBCH 14-16), the results obtained showed a good weed control effect, highlighting the effectiveness of the treatments through a single application. After the application of the treatments with herbicides, good results were obtained regarding the fight against weeds, depending on: the climatic conditions, the degree of infestation, the spectrum and the dominance of the species present in this crop.

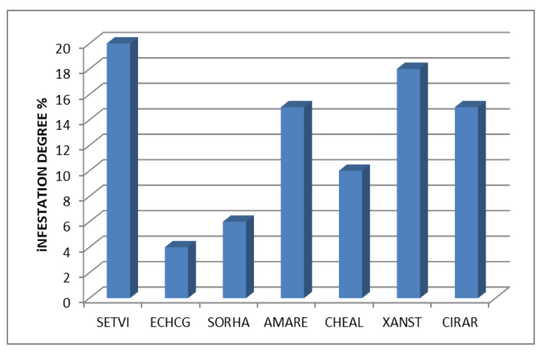

Figure 1**. The infestation degree (%) with weeds**

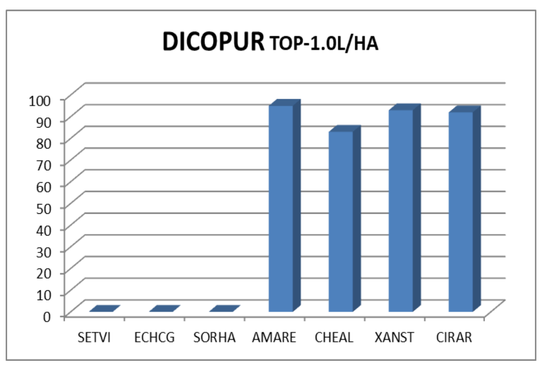

Figure 2 . **The efficacy (%) of the herbicide Dicopur Top**

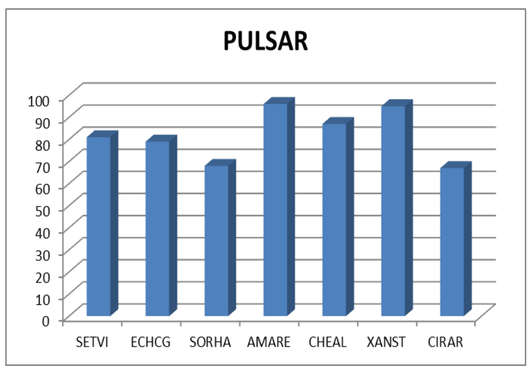

Figure 3 The efficacy (%) of the herbicide Pulsar

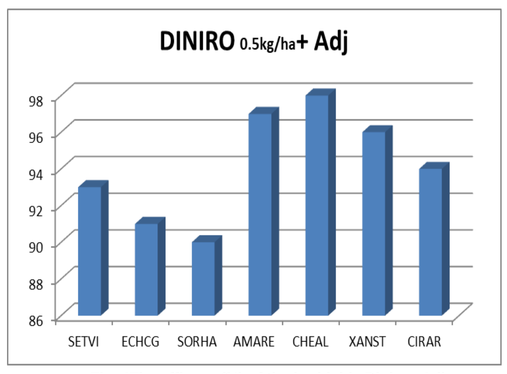

Fig. 4The efficacy (%) of the herbicide Diniro +Adj.

The presence of weeds in this culture is a reality, their predominance being influenced by the cultivation area, the technological links, the preceding plant and the local pedoclimatic conditions. Weed control is the main care work for the crop, being necessary to eliminate the competition of weed species present from the first stages of their appearance and development. The application of the post-emergence (BBCH 14-16) herbicide treatments to the sorghum crop was correlated with the degree of infestation, weed dominance and the recorded climatic conditions.
The post-emergence application of the herbicide treatment (fig.2)-Dicopur Top 1.0l/ha - in the sorghum culture, a superior effectiveness 92-95% was recorded for the annual and perennial dicotyledons *weeds:Amaranthus retroflexus,Chenopodium album,Xanthium strumarium and Cirsium arvense*.Instead *Setaria viridis,Echinochloa crus-galli,Sorghum halepense* were not fought. Figure 3 shows the Pulsar treatment, which after its application, the weeds *Setaria viridis,Echinochloa crus-galli,Sorghum halepense* showed an effectiveness 68-81%.The annual dicotyledons *weeds Amaranthus retroflexus,Chenopodium album, Xanthium strumarium* showed superior efficacy 87-96%. The species *Cirsium arvense* registered a low efficacy - 67%due to the fact that it is a perennial weed resistant.
The variant treated with Diniro 0,5kg/ha +Trend 0,25 l/ha presented a good efficacy 90-93% for the species *Setaria viridis,Echinochloa crus-galli,Sorghum halepense* and for the annual weeds *Amaranthus retroflexus,Chenopodium album, Xanthium strumarium presented a superior efficacy 96-98%.* The perennial species Cirsium arvense was fought of 94%.
Herbicide treatment applied to the sorgum crop (BBCH stage 14-16) did not show phytotoxic symptoms (EWRS scale = 0) for the classical technology. At the imazamox-resistant technology,in the variant treated with Pulsar -1,0 l/h a phytotoxic phenomena were recorded (2% slight yellowing) for the cultivated hybrid –Sentine. At the nicosulfuron-resistant technology, in the variant treated with –Diniro +Trend were registered phytotoxic phenomena (3% embossing) for the cultivated hybrid Zealanda.
The chemical control of the weed species existing in the wheat culture, on the type of cambic chernozem soil from Fundulea, represents an especially important and necessary technological measure. In the field of weed control, the main objective is to reduce the degree of infestation and, last but not least, to identify the most effective combinations of substances, so as to reduce both the impact on the environment and the costs per hectare.
The damage caused by weeds can be diverse and often lead to a decrease in production, an increase in costs, a deterioration in the quality of products, weeds being ideal hosts for pathogens and pests.

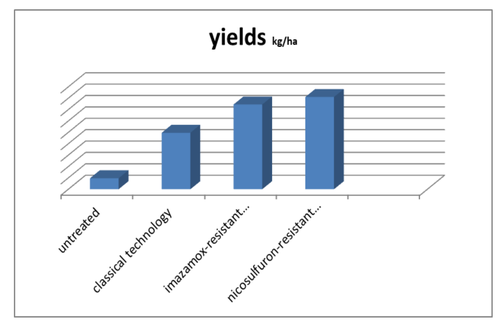

Fig.5 The yields

CONCLUSIONS.

- Sorghum cultivation in conventional systems faces major difficulties in weed control (mono) due to the lack of approved herbicides.
- Compared to annual and perennial dico weeds for which there are solutions, for example Dicopur Top.
- The new technology (sorghum with the imazamox-resistant gene) ensures effective control of annual weeds.
- The new technology (sorghum with a nicosulfuron-resistant gene) ensures effective control of annual and perennial mono- and dicotyledonous weeds

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