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RESEARCH ON THE ACTIVITY OF COMPLEX MIXES OF FOLIAR FERTILIZERS AND HERBICIDES ON THE NUTRITION VALUE OF FODDER

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Abstract

From the research of the herbicides used worldwide it is ascertained that in most of the cases mixes of products are used to obtain a wide action range. Usually mixes of herbicides and complementary action are used, thus obtaining products having a wide action range which enables their use in various fields. The use of the herbicide mixes has important technical and economic benefits: the number of crops treatments are significantly diminished, therefore of the equipment, manpower, thus obtaining important diminishment of the energy consumption.

Key words**:** *fertilizer, foliar, herbicide*

INTRODUCTION

Taking into consideration the technical and economic benefits, we studied the possibility to obtain fertilizing compositions with herbicide mixes. In Romania, mixes made up of the acid 2.4 D and Dicamba manufactured and traded under the name of Icedin Forte and Icedin Super are homologated and licensed to be used.

MATERIAL AND METHOD

To obtain a wide action range we used a mix of 2.4 D (28%) and Dicamba (35%) as dimethylamine (DMA). This systemic herbicide is absorbed by plants both by the root system and by the leaves.

The biochemical mechanism used by Icedin to destroy the weed resides in deranging the growth processes and inhibiting the development of the root system.

ICEDIN FORTE is used to fight and control weeds in the corn, wheat, rye, barley, two row barley, oat crops (when the plant has 2-5 leaves), (in the springtime during the twinning phase until the formation of the second node and the weeds are in the rosette phase, namely they have 2-6 leaves); consumption 2 l/ha for corn, wheat, barley; 1,5 l/ha for the two-row barley and barley.

The ICEDIN SUPER herbicides are used to fight and control the weeds of the straw cereals and used in the vegetation states mentioned for ICEDIN FORTE; consumption 1 l/ha of crop.

In table 1 there are the main species of weeds destroyed by the 2.4D acid and the ICEDIN type products (2.4-D and Dicamba).

From the data presented in Table 1 it clearly comes out that the ICEDIN products have a wider herbicide range than 2.4-D, therefore they were selected to make the mix of fertilizers and pesticides.

We may obtain concentrated emulsions of liquid foliar fertilizers and Icedin, using emulsifier as thickening agents and dispersing agents. We decided that we may obtain compositions of chemical fertilizers as concentrated emulsion using liquid fertilizers (including foliar) and Icedin, having the composition below:

- 100-129 g Icedin;
- 300-350 g solution of foliar liquid fertilizers;

- 20-25 g emulsifier NF-10 (as thickening agent);
- 2,0-2,5 g polyvynilic polyvynil alcohol with GH=88-92% (as dispersing agent).

Table 1. Main species of weeds destroyed by the ICEDIN type herbicide

Name of the weed		Control rate	
Common name	Scientific name	2,4-D	ICEDIN
Yarrow (milfoil)	Archillea millefplium	**	***
Corn cockle	Agrosterma githago	0	****
Mayweed / wild chamomile	Anthemis sp.	**	****
Wild bishop Heart-padded hoary-cress	Biofora radians Cardania draba	0 **	*** ****
Shepherd's-purse	Capsella bursza pastoris	***	****
Creeping thistle	Cirsium arvense	***	****
Convolvulus	Convulsis arvenis Descurania sophia	** ***	*** ****
Field (common) horsetail	Ecuisentum arvense	***	****
Cleavers	Galium aparine	0	****
Chamomile	Matricaria chamomilla	0	****
Matricaria	Matricaria inodora	0	****
Corn poppy (corn rose)	Papaver rhaeas	0	***
black-bindweed pale persicaria	Polygonum convulvulus Polygonum lapthiofolium	** **	**** ****
Sheep's (red) sorrel Austrian fieldcress	Rumex acetosella Rorippa austrica	** **	*** ***
Corn Sow thistle, (Dindle, Field Sow Thistle, Gutweed, Swine Thistle)	Sonchus arvensis Sonchus oleraceans	** **	**** ***
Common chickweed	Stellaria media	0	***
Field Penny-cress Corn (common) speedwell Veronica	Thalaspi arvense Veronica arvense Veronica hederifolia	*** 0 0	**** **** ****
Common vetch Tufted (cow) vetch Hairy (tiny) vetch Hungarian vetch Field pansy	Vicia angustifolia Vicia cracca Vicia herusta Vicia pannonica Viola arvensis	** ** ** ** **	*** *** *** *** ***

LEGEND:
0=inefficient
**= the weeds are approximately 50% destroyed
***= the weeds are approx. 75% destroyed
****=the weeds are approx. 100% destroyed

To obtain a stable in time concentrated suspensions (in which no separations or sedimentations of products as sediment occur), to the obtained compositions we added various jellifying agents.
We used jellifying agents of the polysaccharide class and polyacrylamide solutions in concentrations of 0.1-0.5% compared to the total weight of the mix.

RESULTS AND DISCUSSIONS

CPP-Bucharest tested the herbicide on experimental lots cultivated with Flamura variety wheat. The first treatment was carried out in April and the second one in May. The mix of herbicide fertilizer was sprayed using the manual pump. The observations were made 30 and 60 days after the treatment. The experiments were made in dryness conditions (high temperatures and absence of rain). As standard substance we used the Icedin Super herbicide. During the tests we also monitored the effect of the fertilizer on the way the plants develop and on the increase of the seeds production.
The results of testing the herbicide efficiency of the mix of fertilizer and Icedin Super are presented in table no. 2
The Cereals and Technical Plants Research Institute (I.C.C.P.T.) of Fundulea made the tests on the selection and efficiency of post-emergent application of the mix of foliar liquid fertilizer and Icedin Super at a dose of 5.0 l/ha for the wheat crops. The treatments was carried out when the plants had 2-3 internodes and the dicotyledonous weeds had more than 4 – 6 leaves. To apply the mix we used 400 l of water/ha. The experiments were carried out in unfavorable weather conditions: prolonged dryness, high temperatures (35 - 41°C), extremely small quantity of rain.
The testing took place in the wheat field of Flamura 85 variety and the assessment of the herbicide efficiency was carried out 14 and 28 days after the treatment.

Table 2. The herbicide efficiency of the mix of foliar fertilizer and Icedin Super in fighting the wheat crops weeds

Product	30 days after the treatment						60 days after the treatment					
	Dicot.		Monocot.		Total		Dicot.		Monocot.		Total	
	Dens.	E (%)	Dens.	E (%)	Dens.	E (%)	Dens.	E (%)	Dens.	E (%)	Dens.	E (%)
Untreated sample	10	-	8.5	-	18.5	-	8	-	5.5	-	13.5	-
Fertilizer + Icedin Super 4 l/ha	2	80	2	76.5	4	78.4	3	62.5	2	63.7	5	63
Icedin Super 1 l/ha (standard)	1	90	0	100	1	94.6	2	75	1.5	72.7	3.5	74.1
	DL 0.1(%)=7.58						DL 0.1(%)=4.32					

Dens. = number of plants /m^2
E(%) = efficiency compared to the untreated Mt
Weeds present in the wheat crop
Dicotyledonous weeds: Cirsium arvense
Convulvulus arvensis
Veronica spp
Monocotyledonous weeds: Digitaria sanguinalis
Stegaria glauca

Table 3. Results of the herbicide activity efficiency f the mix of foliar fertilizer and Icedin Super in the wheat crops (ICCPT - Fundulea)

Product	Dose l/ha	Application cleaning	ERWS grade	Efficiency		Average yield		Species of uncontrolled weed (according to the dominance)
			Sel.	14 zile	28 zile	kg/ha	(%)	
Untreated	-	-	1	0	0	3200	100	GAl., Pap., Anth., Chen., Cirs., Conv., Ver., Delph
Icedin Super (standard)	1,0	Postem.	1	90	90	3546	111	Conv., Gal.+Deph>
Icedin Super+ Foliar fertilizer	5,0	Postem.	88	90	90	3520	110	Conv., Gal.+Delph>

Variety of cultivated wheat: Flamura 85
Seeded on: 11.10.1999
Treatment date: 03.05.2000
Rain: 20 days postem.....52.3 mm
Infestation rate: 75%
Present weeds: Galium, Papaver, Anthemos, Matricarin, Cirisum, Convulsuvus, Veronica, Delphinium
DL 5%=370 kg/ha
1%=457 kg/ha
0.1%=610 kg/ha

CONCLUSIONS

After the tests made at I.C.P.P. Bucharest, the following conclusions were drawn:

a) the mix of fertilizer-Icedin Super provides a satisfactory control of the wheat crops weeds;

b) the herbicides efficiency of the composition fertilizer-Icedin Super was comparable to the one of the substance used as standard (Icedin Super); the differences related to the herbicide efficiency of the mix of fertilizer-Icedin Super and the one recorded for the standard substance are in the limits of the specific errors of the statistic calculations;

c) in the evaluation of the tests results we must take into consideration the dryness conditions of the experiments (unfavorable: high temperatures, absence of rain) etc.;

d) because of the unfavorable weather conditions the data recorded on the effects of the fertilizers on the yield increase did not enable evaluations; yet the stimulating effects of the fertilizer on the plant development during vegetation were highlighted by a more intense coloration of the leaves representing the proof of the photosynthesis processes stimulation; moreover, we also noticed as a positive effect of the fertilizer, a higher resistance of the plants to the dryness.

As a conclusion, we assert that the mix of fertilizer and Icedin Forte provides an adequate control of the weeds in the wheat crops.

After the tests carried out at I.C.C.P.T Fundulea, the following conditions were drawn:
a) the herbicide efficiency of the mix of foliar fertilizer and Icedin Super is satisfactory (88-90%), comparable to the efficiency of Icedinului Super used as standard substance 14 days after the treatment and equal 28 days after (both products had a herbicide efficiency of 90%). As well, the selectivity of the mix fertilizer + herbicide was similar to the one of the standard product;
b) in the assessment of the herbicide efficiency we must take into account two determining factors:
-b.1.) the treatment was far too late compared to the vegetative state of the weeds (the dicotyledonous weed had more than 4 – 6 leaves; the species Convulus, Galium, Papver and Delphinium were 10-15 cm tall; in this stage of weeds' vegetative development, the efficiency of the herbicides is significantly reduced;
-b.2.) the assessment of the fertilizer's influence on the production of berries was not possible because of the dryness conditions of the experiments 28 days after the treatment, on the areas treated with mix of fertilizer Icedin and those treated with Icedin Super (standard substance), the weeds totally dried out; given the circumstances, the yields increases for each separate case did not significantly differentiate (the treatment with the mix of fertilizer + herbicide recorded a 110% increase and for the lots treated with standard substance the yield increase was of 111%.
As a conclusion, we believe that the herbicide efficiency and selectivity of the mix of foliar fertilizer and Icedin Super were similar to those recorded when using Icedin Super herbicide as standard substance.

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