REGULATION IMPLICATIONS ON BANNING THE TREATMENT OF SEEDS WITH NEONICOTINOID INSECTICIDES ON THE SEED MARKET IN ROMANIA

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Abstract: *Having in view that (EC) Regulation 485/2013 forbids the utilization of insecticides that contain active substances from the neonicotinoid group for the treatment of seeds, except for the winter cereals, this restriction being valid for two years, and in this period the impact on the bee population will be evaluated, the present study intends to quantify the impact of this measure on the Romanian market. In Romania, a series of dangerous pests is present, which in the absence of seed treatment can bring about serious damages. The results of the study reveal a negative impact at the level of farmers, seed industry, agricultural input traders and the state budget; overall, Romania's agriculture will have annual losses ranging from 623,889 million euro in the variant of production diminution by 20% to 922,759 thousand euro in the variant of production diminution by 40%, adding to the crop re-establishment costs on 15% of the area totaling 562 thousand euro.*

Key words: *seed treatment, insects, impact on seed market*
JEL Classification: *Q110*

INTRODUCTION

One of the most critical decisions that a farmer has to make is the choice of the seed variety and supply source. The seeds costs usually account for 5-10% of the total production costs, if we opt for a complete crop technology. Thus, the seeds affect the average yields much more than any production factor. The use of certified seeds represents one of the best farm management tools.

Since 1957 double maize hybrids began to be cultivated in Romania, which replaced the local varieties and populations; in that year, hybrid seeds for this crop began to be produced (Covor, 1961; Mureşan and Vionea, 1959). Thus, in the year 1963, significant amounts of hybrid seeds were obtained, so that in the year 1964 the utilization of hybrid seeds in production was generalized (Manoliu et al., 1967).

The hybrid seed was for the first time processed in Romania by the seed conditioning stations built in the period 1957-1960. As far as the certified seed production sector developed, the seed processing facilities also increased. In the year 1989, Romania had 128 seed conditioning stations with a total capacity of about 1,500 thousand tons.

With the land restitution beginning in the year 1990, the decentralization in the economy and the blockages at farm level, the certified seed market became unpredictable. The institutes that were concerned with the creation of varieties and hybrids as well as with their multiplication and processing were in the situation of not being able to place the produced biological material on the market or they did not cash its counter value. This led to the diminution of processing capacities utilization.

Following the ASAL reform (1997), the legislation on the production, quality control, planting stock sale and utilization, as well as the crop varieties registration was modified, so that all the varieties registered in the European Community register could be automatically used in Romania.

This moment marked the opening of the seed market not only for the imports of foreign varieties but also for the seed production, processing and marketing in Romania, as

well as for their export. As a result, an increasingly great number of well-reputed companies began to establish offices in Romania.

The foreign companies began to use the local facilities, the seed conditioning stations respectively. But most often, mainly in the case of maize, malfunctions appeared on the driers, which had as effect the seed "burning", compromising the respective seed lots. Certain foreign companies increased the quantities of produced seeds and built up their own seed processing stations. As a result, very many seed conditioning stations were no longer used out of the lack of raw products and became technically non-functional. They can no longer be modernized as the last generation equipment for seed conditioning have other size and they cannot fit into the built-in perimeter of the stations designed and built before 1990.

The average yields obtained in Romania in most crops reveal an inadequate cropping technology together with the utilization of cheap, low-quality inputs.

In the year 2012, the total production of certified seed amounted to 359 thousand tons, on 144 thousand hectares.

As a result, there was a decline in buying certified seeds, and the research stations specialized in seed and planting stock production were found in the impossibility to sell the produced certified seeds and to maintain the lines and superior forms of biological multiplication material. No investments were made in the latest technology to obtain new crop varieties; furthermore, the research stations began to have increasing financial problems. In these conditions, the top researchers of the Romanian genetics and crop breeding migrated to the offices of foreign firms from Romania, with plenty of endowments and financial resources. The difference of technology used to obtain new genetic material created favourable conditions for introducing into cultivation foreign varieties and hybrids. The phenomenon gained ground with the liberalization of prices (1996), mainly for crops with self pollination, where seeding varieties were used. With the seed reform of 1997 (ASAL[1] Program), the varieties from the European Register were permitted to be cultivated in Romania, and the demand of seeds and planting stock mainly went to the foreign varieties.

In these conditions, the medium and large-sized farms use certified seeds for the crops where hybrids are used, while for the crops where multiplication is based on varieties, they buy seed from higher technological links that they multiply 2-3 years and they renew the seed stock afterwards.

Since January 2007, the moment when Romania joined the EU, and subsidies per hectare of cultivated area were received, the commercial farms and not only these became increasingly interested in buying high quality inputs and the demand for certified seeds increased.

A new approach on the world seed market was noticed, starting with the year 2007 according to the national French Federation of maize and sorghum[2] the multinational seed companies sacrificed the trade with seeds in favour of seed multiplication in the vicinity of zones where these are sold. This new strategy also made Romania become an attractive market for the multiplication of maize seeds and not only, for their sale on Russia's and Ukraine's markets, and part of these is also sold on the Romanian market.

Seed production in Romania is generally on contract basis between the seed company and the farmers. The main counties in which seeds are multiplied are the

[1] Final Report of ASAL Implementation and Intensive Study in Romania – Evaluation of ASAL Policies; April 19, 2001, Warehouse receipts, interprofessional grain organizations, seed and grain grading reform

[2]Maiz'info Publication of France National Federation of Seed Maize and Seed Sorghum Production

following: Brăila, Iaşi and Călăraşi. The advantage of multiplication in these areas consists of: farmers' experience in seed multiplication technology, possibility to ensure isolation spaces for the seed plots, endowment with specific equipment (castration equipment), functional irrigation system or adequate microclimates for seed production securization.

Depending on the crop, farmers' incomes can be 2-3 times higher in the case of seed plots compared to conventional crops.

While a farmer can decide each year to cultivate a certain species, rapeseed for instance, depending on the weather conditions of the respective year, the seed company must plan the seed production 4–5 years before.

The greatest part of the certified seeds exported by Romania comes from foreign hybrids, only the seed being multiplied in Romania. Generally the imported quantities represent the higher links (parental forms) – which are used for multiplication. Part of the import consists of imports that are obtained in other country and sold to Romania.

Romania's trade with certified seeds had an increasing trend in the last 6 years, even though the drought had a negative impact upon the multiplications in the years 2008 and 2009 by the diminution of the supply of parental forms. The foreign currency contribution from the trade with sunflower, rapeseed and maize totalled 150,201million euro in 2012, compared to the deficit of -15,317million euro in 2007.

PREVIOUS STUDIES AND RESEARCH METHODOLOGY

The study "Socio-economic and environmental impact of the treatment of seeds with neonicotinoids in the European Union" (2013), conducted under the aegis Humboldt Forum for Food and Agriculture (HFFA), reached the conclusion that in 5 years' time, the loss of this technology could imply costs up to 17 billion euro in the agriculture and enlarged economy of the European Union, which would affect a number of 50,000 jobs, mainly in Eastern Europe. The study included an analysis of 10 countries from the EU (Germany, Poland, Hungary, Romania, Slovakia, Italy, Spain, France, United Kingdom and Netherlands) and 6 key-crops (maize, sugar beet, rapeseed for oil, wheat, barley and sunflower); the project team evaluated the potential value of the seed treatment with neonicotinoids for the companies, economies and different other stakeholders from the EU.

The methodology used for the quantification of the impact resulting from banning the use of neonicotinoid-based substances in the treatment of maize, sunflower and rapeseed seeds followed the HFFA methodology, namely two scenarios were used, i.e. production losses of 20% and 40% respectively. The assumed hypotheses were the following: (1) we considered the year 2012 as the base year, as it was the last year for which we had definitive statistical data available (areas, average yields, total production, average prices); (2) the product prices are considered constant (3) we quantified the impact for the consumption seeds and the planting seeds separately, due to their different selling prices (4) we considered that 15% of the planted area is fully destroyed by pests in the crop emergence period as a result of non-applying the seed treatment with NNi (neonicotinoid); (5) the amount of seed used per hectare increased by 15 % for a higher plant density in order to diminish the effects of pest infestation; (6) we calculated the losses resulting from production diminution by 20% and 40% respectively. The data used were obtained from on-farm interviews, data provided by companies and official statistics. On the basis of calculations we determined the losses for farmers, seed processors, traders as well as the losses from the state budget.

RESULTS AND DISCUSSION

The European Commission, through Regulation 485/2013 banned the utilization of three insecticides (active substances) from the neonicotinoids group (clotianidin, imidacloprid, thiamethoxam) for the treatment of seeds, except for winter cereals. This regulation has numerous effects upon Romania's agriculture, in the conditions in which it impacts the seed treatment as a means to control certain dangerous pests [Tanymecus dilaticollis (maize leaf weevil), Agriotes sp. (wireworms) and Diabrotica virgifera virgifera (Western corn rootworm) Athalia rosae L. (rapeseed sawfly), Phylotreta spp. and Phylloides spp. (earth fleas).

The domestic consumption maize market from Romania is worth 1,359 million RON, the profit from maize seed production is about 3 times as high compared to the consumption maize seed. The treatment with NNi-based chemicals applied to the maize seeds for planting amounts to 34.8million euro.

In the two variants of production diminution, the total production losses will range from 518 to 764 million euro, the greatest losses going to farmers (86-89%). The losses at the level of processing and marketing will range from 48 to 56 million euro.

Table 1

Economic impact of banning the use of neonicotinoids treatment for the maize seed processing sector and the state budget

Item	Scenario 1 20% loss		Scenario 2 40% loss	
	Losses thousand euro	%	Losses thousand euro	%
Farmers	-444266	77.7	-681358	79.7
Seed processing + commercialization	-48692	8.5	-56086	6.6
State budget, seed certification, 16% tax	-78873	13.8	-117991	13.8
Total losses	-571831	100	-855435	100

Source: Own calculations based on the official statistics and on data provided by companies

In order to maintain constant the production level from the base year, the areas under maize should increase by about 1.1 to 2.2 million hectares, which would determine monoculture and a much higher pest infestation.

Table 2

Extra land area that should be planted to have the same maize production as in the base year

	Production diminution by 20%	Production diminution by 40%
Extra land area on which maize should be planted so as to have a constant production as in the year when NNi treatments were applied - thousand ha	1089	2227
Total area cultivated with maize – thousand hectares	3413	4551

Source: own calculations based on official statistics and on data provided by companies

In order to evaluate the impact of banning Nni treatments on rapeseed we took into consideration a diminution of area by 25%, according to interviews at farm level.

Table 3

Financial impact of banning the treatment on the players on the rapeseed market from Romania

	Scenario 1		Scenario 2	
At the level of:	Losses thousand euro	%	Losses thousand euro	%
Farmers	-4741	71.8	-6490	73.7
Seed processing + commercialization	-836	12.7	-897	10.2
State budget, seed certification, 16% tax	-1025	15.5	-1422	16.1
Total losses	-6602	100.0	-8810	100.0

Source: own calculations based on official statistics and on data provided by companies

In order to compensate the production losses as a result of banning the treatment with NNi, an extra land area of about 64 - 87 thousand hectares should be cultivated with rapeseed, compared to the base year.

Table 4

Extra land area to be cultivated with rapeseed so as to have the same rapeseed production as in the year when seed treatments were applied

	Production diminution by 20%	Production diminution by 40%
Extra land area on which rapeseed should be planted so as to have a constant production as in the year when NNi treatments were applied - thousand ha	63,789	87,252
Total area cultivated with rapeseed - thousand hectares	135,982	159,454

Source: own calculations based on official statistics and on data provided by companies

The farmers who cultivate sunflower will have the greatest losses by banning the NNi technology, the losses ranging from 34 233 to 45 373 thousand euro.

Table 5

Financial impact of banning the treatment on the players from the sunflower market in Romania

	Scenario 1		Scenario 2	
At the level of:	Losses thousand euro	%	Losses thousand euro	%
Farmers	-34233	75.3	-45372	77.5
Seed processing + commercialization	-4952	10.9	-5071	8.7
State budget, seed certification, 16% tax	-6270	13.8	-8071	13.8
Total losses	-45455	100.0	-58514	100.0

Source: own calculations based on official statistics and on data provided by companies

Table 6

Extra land area to be cultivated with sunflower so as to have the same sunflower production as in the year when seed treatments were applied

	Production diminution by 20%	Production diminution by 40%
Extra land area on which sunflower should be planted so as	424.28	490.84

to have a constant production as in the year when NNi treatments were applied - thousand ha		
Total area cultivated with sunflower	1331.27	1397.83

Source: own calculations based on official statistics and on data provided by companies

CONCLUSIONS

1. In the conditions of banning the neonicotinoid insecticides (clotianidin, imidacloprid and thiamethoxam) for the treatment of seeds, at present there are no other efficient authorized products;
2. In Europe, the general area of infestation with the insect Tanymecus dillaticolis is limited to Black Sea zones (Romania, Bulgaria, Turkey, Moldova, Ukraine, Russia), with the specification that the most significant insect populations, as well as the most significant infestation level are signalled out in Romania;
3. Per total agriculture, the losses will range from 623889 thousand euro in the variant of production diminution by 20% to 922759 thousand euro in the variant of production diminution by 40%.
4. In the structure of these losses, 72 % and 80 % of farmers will be affected. The losses by crops: maize from 571831 to 855435 thousand euro, rapeseed from 6602 to 8810 thousand euro and sunflower from 45455 to 58514 thousand euro;
5. Significant losses will be also found at the level of agricultural input suppliers (seed processors and traders and crop protection products) as well as at the state budget level (tax on profit and incomes from seed certification);
6. The production losses should be compensated by planting extra areas and by replanting the compromised areas;
7. In the future, Romania can become an attractive country for the multiplication of seeds for export into non-EU countries (Ukraine and the Russian Federation);

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