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Latest News

A few considerations regarding the treatment with neonicotinoid insecticides on bees and hive products

Gheorghe Ionescu-Sisesti Academy of Agricultural and Forestry Sciences (AAFS), Bucharest, Romania, initiated in 2018 a research project aimed at the impact of treatments with neonicotinoid insecticides on the seeds of autumn (rapeseed) and spring crops (corn, sunflower, sugar beet) to determine their presence in soil, plants, hive products, in order to prove that the restrictions imposed on seed treatments are unjustified.

Within agricultural regions of Romania, the main soil pest species of rapeseed, corn and sunflower crops are *Agriotes* ssp. (wire-worms), *Tanymechus dilaticollis* (corn weevil) and *Bothinoderes punctiventris* (sugar beet weevil), as Romania is their region of origin and distribution.

From a technical point of view, the discovery of neonicotinoid insecticides, with systemic action and application by seed treatment, was the qualitative leap expected by the professional agricultural community. For these reasons, the suspension of the use of neonicotinoid insecticides was **the major technological shock** faced by the Romanian farmers, specialised in corn culture (27-30% of arable land) and sunflower (about 8-10% of arable land) in Romania.

Since 2013, the European Union has restricted the use of certain neonicotinoids by Regulation (EU) No. 485/2013, despite the opinion of the scientific community that it was demonstrated to have an extremely low impact on the environment and related wildlife.

Research undertaken under the coordination of AAFS with the funding from the Ministry of Agriculture and Rural Development and AAFS Heritage Foundation, by five prestigious agricultural research institutions: Bucharest Research and Development Institute for Plant Protection – the coordinating institute, *Fundulea* National Agricultural Research and

Development Institute, (South Romania), Research and Development Institute for Beekeeping, *Secuieni* Agricultural Research-Development Station (Moldavian Plateau), *Pitești* Agricultural Research-Development Station (Southern Sub-Carpathian Hills) were conducted to determine the residues of neonicotinoid insecticides in soil crops (including flowers) and hive products (pollen, honeycomb, honey, dead bees) obtained from rapeseed, corn and sunflower crops, whose seeds were treated with imidacloprid, clotianidin and thiamethoxam.

The samples from the hive products were collected from the bee families located in the proximity of these crops. The analyses were carried out in the accredited laboratories of the EU-ANSES (France), Quality Services International GmbH – QSI (Germany) and PRIMORIS (Plovdiv, Bulgaria).

In the case of soil samples collected in the proximity of seeds treated with neonicotinoids, the presence of residues ((the limit of quantification, LOQ) was reported in all test years in the range of 9%-40%, suggesting that the migration of neonicotinoids in the soil in the proximity of seeds is affected to a large extent by the level of precipitation/amount of precipitation achieved in the respective locations, immediately after sowing.

In the case of dead bees samples, collected during the four years of experimentation, only in 2 samples from 2018 (from 10 samples), residues over the LOQ limits were identified, while the samples taken in 2019, 2020, 2021 did not contain neonicotinoid residues from those used to treat the seeds from which the crop had been started.

In one year (2018), neonicotinoids applied to seeds were identified in flowers. In the following years, respectively 2019, 2020, 2021, **no sample with neonicotinoids residues above LOQ limits was identified** in the flowers of the experienced crop plants (rapeseed inflorescences, sunflower seeds, corn panicles), although the number of the samples analysed has increased significantly.

In the case of hive products (pollen, honey, honeycomb with brood) harvested from three test fields, the situation was similar, namely in 2018, 2 samples (from 10) were identified over the LOQ. In the following years (2019, 2020, 2021), **no pollen sample was identified** (this being the main food reserve of bees during winter) containing neonicotinoid.

Of much importance is the analysis performed on the brood combs (harvests 2020 and 2021, respectively), in which no exceedances of the LOQ limit with neonicotinoids, resulting from the treatments applied to the seeds, were identified.

In the case of honey (processed by bees from the nectar of plants whose seeds were treated with neonicotinoids during the four experimental years), **no sample with LOQ limit exceeded was identified**.

The research conducted in Romania confirms the research carried out at pan-European level by the Centre for Ecology and Hydrology of Great Britain (CEH) conducted in Germany, Great Britain and Hungary on rapeseed, whose results were published in May 2018, in *Science* magazine.

Summarising the results of the study conducted by Romanian researchers, we may state that they show that **the lowest percentage of samples with residues over LOQ** was recorded in the samples of inflorescences/flowers, pollen and the main vectors of neonicotinoid residues used in the treatment of seeds and incriminators (ultimately of bees death/ reduction of bee populations). It should be noted that, especially in the last years of experimentation, they could not be identified in the analysed samples, including dead bee samples.