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COMPOSITE DOCUMENT OF PRESENT POSITION RELATING TO GAUCHO /
SUNFLOWER and BEES

Coordination des Apiculteurs de France :

Syndicat National d'Apiculture
Syndicat des Producteurs de Miel de France
Union Nationale d'Apiculture Française

Paris, 18th. December 2000.

PREAMBLE : a Press Release dated 16th. December 1998, produced by the Minister of Agriculture and Fisheries, announced that:

The Advisory Commission on Pesticides (Commission de Toxiques) charged to evaluate the impact of Pesticides have studied the dossier "GAUCHO" (Imidacloprid - BAYER). Following these studies, it has published the following advisory comment

QUOTE:

"Taking into account recent studies evaluating the impact that Imidacloprid could have on the activity of bees when used as a seed treatment for sunflowers ", the Commission des Toxiques during its meeting held on the 16th. December 1998 considered that:

A: The examined data does not allow for a conclusion of indisputable effect of imidacloprid or its metabolites on bees and the production of honey.

B: Conversely, it is not possible to totally exclude the effect of Imidacloprid and its metabolites, taking into account the toxic effects of minute doses, doses that are in keeping with those concentrations potentially present in the plants during the period of harvest.

C: That complementary research should be undertaken to clarify the following points:

- 1. The metabolism of the product in parts of the plant accessible to bees.***
- 2. The limit of the toxicity of the product and its metabolites for bees and the quantities present.***
- 3. The persistence of Imidacloprid in the soil and the presence in crops that have not been treated.,***

END QUOTE

At this date we are uninformed of the response by BAYER

On the other hand, the results of work undertaken between 1998 - 2000 by researchers in **public science institutes** have been supplied to us after their presentation to the Commission des Toxiques, on 15th November and 13th. December 2000.

It appears to us that the results we present below deal with the questions raised by the Commission des Toxiques.

The Metabolism of Imidacloprid in parts of the plant accessible to bees.

Dr. J.M. Bonmatin, CNRS Orléans (Centre d'Etudes et de Recherches par Irradiation)

During the growing period of sunflowers treated with GAUCHO, the levels of Imidacloprid decrease. From the start of flower formation, this level shows an important and rapid increase. Depending on the plant variety, the average value in the flower at the beginning of the flowering period varies from 5 to 6 ppb. Equally in maize, Imidacloprid is found throughout the plant, notably in the panicle (average: 4 ppb.) and in the flower (average: 10ppb.). Sunflower and maize both allow for an important bioavailability during the flowering period. In the environment where sunflowers are treated with GAUCHO and also whenever it was used for maize (GAUCHO sites in field trials undertaken by ACTA in 1998), the pollen from traps commonly contained around 5ppb Imidacloprid.

ABSTRACT:

Fate of systemic insecticides in fields (imidacloprid and fipronil) and risks for pollinators

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Imidacloprid binds nicotinic ACh receptors. The vital functions of bees are affected by sub-lethal levels of imidacloprid from 2 to 20 µg/kg in the feeding source.

Chronic mortality (50%) was observed at 0.1 µg/kg. We developed a LC/MS-MS methodology for plants and pollens (LOQ:1 µg/kg) according to GLP and directive 96/23 EC. Our results show that Imidacloprid (Gaucho seed dressing) diffuses in sunflowers and maize with an ascent at the flowering. Here, average levels are 5-8 µg/kg in flowers and 2-3 µg/kg in pollens. PEC/PNEC, calculated from the consumption of pollen by bees, is then in the range of 20-30 when considering the loss of feeding activity. **PEC>PNEC is 700-800** when considering the chronic mortality after 11 days. The ratio further increases when considering also the contamination of nectar (1.9 µg/kg). Gaucho on sunflower has been suspended in France since 1999. A new evaluation for maize is in progress.

Fipronil is another systemic insecticide acting on GABA regulated receptors. It induces significant mortality of bees from 0.01 µg/kg, while sublethal effects were observed at the µg/kg level. We developed a GC/MS method for pollens with a LOD at 0.02 µg/kg and a LOQ at 0.2 µg/kg. The results indicate clearly that fipronil and its metabolites can reach the pollen of sunflower and maize due to the Regent TS formulation. This insecticide has been suspended in France in 2004.

The research was performed for the French Ministry of Agriculture with the EC financial aid.

M. Fr. Laurent, INRA Toulouse (National Institute for Agricultural Research)

Tracing and measurement of the radioactivity at different ages and in different parts of the sunflower plant). In stem sections as in the leaves of one-month-old plants, one finds the occurring gradient, except that the leaves are 10 times more charged in Imidacloprid than the corresponding stem section. The metabolic profiles in the different plant organs all show a peak mainly of Imidacloprid (50 -80%). It is established that the half-life of the original molecule by itself in sunflower is in excess of 60 days. At the moment of flowering, there appears to be a transfer towards the capitulum, notably towards during the sepal and outer edge seed formation. It is suggested that this mobilisation is able to cause even higher levels of contamination of nectar and pollen produced by the inner rings of florets. In pollen, the global residue measurement of Imidacloprid is in the order of some ppb.

The CETIOM. (Centre Technique Interprofessionnel des Oléagineux Métropolitains)

The nectar of sunflower contains between 0.4 and 5.0 ppb. total residue, it being taken that these total residues are essentially of Imidacloprid.

M. Kl. Wallner (Univ. of Hohenheim, Germany)

The nectar of Phacelia, treated with GAUCHO (50 g active material/hectare), taken from the

crop of the harvesting bees contained between 3 and 10 ppb. Imidacloprid. The pollen collected by the bees was contaminated at the same level. (Toxicological studies accept that fruits such as apples and peaches may be put on to the market for human consumption, if the residues of Imidacloprid do not pass the limit of 300 ppb. Consequentially, the presence of Imidacloprid and or its metabolites at a level of a few ppb. in the produce from hives should not pose any problem in terms of human health.)

2. The limit of the toxicity of the product and its metabolites for bees and the quantities present.

Dr. M.E. Colin (INRA Avignon)

The frequentation, characterised by differing criteria, at a source of syrup either contaminated or un-contaminated - was studied in semi-controlled conditions. For Imidacloprid, the negative effects are still present at 6 ppb. At 3 ppb., the effects are still present under certain criteria. (BAYER communicated in January 1997 during the A.N.P.P. Congress that the first effects on the bee show from levels of 5,000 ppb.. Three years later, this threshold has been brought down to a few ppb.!). The toxicity of the derivative OLEFINE is clear at 1.5 ppb.; it is still present at 0.75 ppb. - but with a less regular occurrence.

Dr. M.H. Pham-Delègue (INRA Bures sur Yvette)

(November 2000): Showed that prolonged ingestion of Imidacloprid contaminated syrups cause a significant decrease in performance of Olfactory learning at levels between 6 and 12 ppb..

Dr. L. Belzunces (INRA Avignon)

Showed that prolonged ingestion by bees of 4.5 picogramme of Imidacloprid and associated metabolites /24 hour cause the appearance of significant mortalities, 3 to 4 days after the start of the treatment, which corresponds to the time delay between nectar flow and hive population losses observed by beekeepers. According to M. Belzunces, it is very probable that the intoxication process in bees by Imidacloprid is due to the presence of toxic metabolites with a particularly noxious and "deceitful" action. The breakdown into the toxically significant metabolites originating from Imidacloprid by bees is very rapid: the half-life of the original molecule is situated between 2 and 4 hours.

3.The persistence of imidacloprid in the soil and the presence in crops that have not been treated?

The CETIOM.

Imidacloprid is present in soil for several years after the last treatment. Throughout these years, untreated sunflower plants present this residual Imidacloprid

Dr. J.M. Bonmatin (CNRS Orléans)

Throughout, where treatments from one or two years previous are present the concentrations of residual Imidacloprid are able to reach levels of up to 10 ppb.. Even in the case of only one "GAUCHO" treatment two years previous Imidacloprid is still detectable in the soil. He states that these results are compatible with recent published results from BAYER. Like CETIOM, he also concludes that sunflowers are capable of absorbing and expressing the presence of residual Imidacloprid from crops treated two years previously with GAUCHO. The capacity to absorb residual Imidacloprid from soils falls in the following direction:

- Sunflowers and Maize more than self propagating plants (volunteers), more than Rape (Canola), more than Wheat.
- Sunflowers and Maize are able to absorb residual Imidacloprid to reach levels of 8 ppb..

IMPORTANT

Before the grave problem of undue soil persistence by Imidacloprid was observed, CETIOM and BAYER were employed to verify if soil accumulation was a concern. They estimated that after three years of GAUCHO treatment a stabilised threshold value was reached – (this information has not been released to us). We would like to know who allows the continuation

of this position: CETIOM's protocol proposal that the measure of residues in sunflower plants serves as an indicator of the of residual Imidacloprid levels in soils is certainly not ready to be validated!!

M. Bonmatin (CNRS Orléans) analysed in year N. the soils supporting a non-treated GAUCHO crop, knowing that they during the two previous years, i.e. N -1 and N -1 plus N -2 had been treated with GAUCHO. They contained on average Imidacloprid at 4.8 and 8.6 ppb. respectively, which confirms the phenomenon of accumulation, seeing that there is nearly a factor of 2 between these values. Also one is able to reasonably infer that the soils with three years previous GAUCHO treatment (N -1, N -2 and N -3) would contain on average 10 ppb. Imidacloprid. Accepting that Imidacloprid has very low mobility in soil and that it stays in the upper 30cm soil horizon, one may calculate that with an average burden of 10 ppb. it is equivalent to 50 grammes of Imidacloprid/hectare, and therefore by implication equivalent to a treatment of GAUCHO on sunflowers!!

Considering that:

Imidacloprid has a negative effect on individual bee behaviour,

- at 1.5 ppb when foraging
- between 6 and 12 ppb. when relating to criteria allied with olfactory memory and recruitment
- When relating to sub-chronic toxicity and daily doses of 4.5 picog.,

THERE IS A SIGNIFICANT IMPACT ON THE SURVIVAL OF THE HARVESTING BEES.

- Due to sub-lethal effects of certain metabolites of Imidacloprid to be more toxic than the original molecule
- Due to Imidacloprid being available through nectar and/or pollen of crops treated with GAUCHO at a level of up to 5ppb
- As the level of accumulated residual Imidacloprid from 3 previously GAUCHO treated crops (equivalent to that delivered by a sowing of GAUCHO treated sunflower seed)
- That sunflowers and maize are particularly capable at absorbing residual Imidacloprid

IT IS EVIDENT THAT DURING THE FLOWERING PERIOD OF GAUCHO TREATED SUNFLOWER AND MAIZE AS WELL AS ALL CROPS WITH APICAL INTEREST CONTAMINATED BY PREVIOUS GAUCHO TREATMENTS - FORAGING BEES ARE EFFECTIVELY EXPOSED TO DOSES OF IMIDACLOPRID WHICH IN LABORATORIES HAVE REVEALED A NEGATIVE IMPACT.

In the open countryside, this negative impact is verified by practical observation during the sunflower honey flow:

Dr. M.E. Colin (INRA Avignon) :

Having analysed video documentation obtained from sunflowers growing in agricultural conditions during 1998 and 1999, Dr. Colin has been able to conclude that foraging by bees on sunflowers treated or contaminated with GAUCHO, takes place with less efficiency and with a behavioural compoment very different to that compared with those foraging sunflowers growing in Organic conditions and on soils that have never received any GAUCHO treatment.

Beekeepers Experience:

Since 1994 for some people, and from 1995 or '96 for others, depending on the region, Beekeepers have observed harvesting problems with the bees during the sunflower nectar flow: problems of acute-colony-collapse and of aberrant behaviour patterns, growing year on year. In their judgement, there is no longer any doubt that these phenomena are linked to the crop-flowering-period. It requires only 3 or 4 days from the start of the sunflowers blooming before the problems begin - this normally occurs at the beginning of July. It is the same phenomenon every year - but only when the beehives are placed in the crops treated with GAUCHO. Those hives which were previously removed to other areas for different nectar flows of: sweet chestnut, lavender, pine and wild blossom escape the fore-mentioned phenomena. The year that GAUCHO is introduced into any farming area the troubles appear for the first time. The phenomena include:

- Destabilisation of the bee colony to the point that normal harvesting of the honey-flow collapses
- The size and dependability of sunflower-honey harvests from have declined progressively as compared to the 1995-'96 levels. The year 2000 provided only 30 to 40% of the normal sunflower harvest levels.

The above analysis requires that a definitive ban on all agricultural uses of Imidacloprid should be issued immediately. We do not imagine that the studies undertaken by BAYER (1995-2000) – acting as judge and jury in the entire issue - are able to contradict the fore-mentioned contributions made by the Public Researchers of France.

Coordination des Apiculteurs de Fr