

Research 3.4 Insecticides

A. Neonicotinoids.

The damage that this class of (kill all insects) pesticides appears to have done to the eco-system has become both profound and universal. There is no longer an uncontaminated base line to which damage can be compared. The only (dubious) benefit that we get is that we no longer get insect spattered car windscreens. The “crop protection” industry may be profitable, but it is a brutal and primitive method that will be superseded by genetically modified insect releases.

On page 11 of New Scientist (21 September 2013) an article written by Andy Cohan explains what must be the future. It describes the now proven method of genetically modifying the male insect of a pest species so that its female progeny die before it can reproduce. The male progeny continues to propagate the lethal gene through the population. It is simply bred and released into the environment.

Tony Nolan of Imperial College says that “It is strictly species-specific as the insects only seek out mates of their own species. Controlling the pests with insecticides would not be so discriminating”.

B. Mistaken assumptions on the usefulness of honeybees to Oil Seed Rape production

An agri-chemical witness (28/11/2012) stated (to the Environmental Audit Committee in the Houses of Parliament) that only about 10% of OSR is insect pollinated. Research in Pakistan (part copied below) indicates that it is considerably more at about 80% by yield.

Pak. Entomol. Vol. 31, No.2, 2009

THE POLLINATION BY HONEYBEE (APIS MELLIFERA L.) INCREASES YIELD OF CANOLA (BRASSICA NAPUS L.)

ABSTRACT

In order to quantify the response of honeybee on canola seed yield, an experiment was conducted at National Agriculture Research Center, Islamabad, during 2007-08, in complete randomized block design with two treatments (i. Plants caged with honeybees ii. Plants caged without honeybees) with four replications each. Number of pods set, pods weight, seed count in hundred pods and yield per plant were measured in twenty randomly harvested plants. The results showed significant increase in all the plant parameters caged with bees as compared to the plants without bees (control).

Number of pods and number of seed pods with pollination were 815 and 20 while without pollination was 349 and 15. The seed weight and yield (gm) with pollination was 26 and 7.6 (gm) and without pollination was 9.3 and 1.51 (gm), respectively. It is concluded from the experiment that honeybee visitation to the canola flowers is

important for pollination and increasing seed yield.

Key words

honeybee, pollination, canola, seed yield.

To get the full picture of how important pollinator insects are to OSR the original research document (abstracted above) can be inspected where diagrams show unequivocal dependence upon them. See

[http://www.pakentomol.com/Downloads/Issues/2009-2/ent4-paper%20canola%20paperfinal\[ms%20munawar.pdf](http://www.pakentomol.com/Downloads/Issues/2009-2/ent4-paper%20canola%20paperfinal[ms%20munawar.pdf)

Any beekeeper instinctively knows that 10% must be a gross under estimate and it seems to have been proven in Pakistan in 2009 where yield without honeybees would be only 20% of that with them. (i.e. 7.6 gms. compared to 1.51 gms.) The only obvious caution is that the density of honeybees in the cages may have been far higher than normally found, but this is an argument for more honey bees rather than less.

The chemical companies appear to have mismanaged farmer perceptions with great skill. Farmers have become chemical addicts in the mistaken belief that no insects are better than any, even pollinators, because they were only worth 10% of OSR tonnage. The reality is that they are worth about 80% and deserve better treatment, if only for enlightened self-interest. Our bees pollinate farmers OSR and in exchange (*prima facie*) they kill them.

If production tonnage of OSR were the sole criteria for good, it would appear that the chemical companies who produce neonicotinoids should stop doing so immediately and take up beekeeping.

A policy among farmers of mutual restraint in the use of these chemicals needs to be initiated. To act alone and not use them when others will do so is pointless. Only a change in the law will ensure the benefits of mutual restraint will accrue to all.

C.Flawed methodology for testing the impact of neonicotinoids on honeybees.

There is a *prima facie* case to be made that the test methodology used is grossly underestimating the effects of neonicotinoids on honey bees and their larva.

Who designed the methodology for testing these chemicals on bees?

If you go to The Website "Beyond Pesticides" and watch the video "Killing Bees - Are Governments and Industry responsible" you will hear an American beekeeper describe the methodology used in the United States by their Environmental Protection Agency. It is the same as that used here in the U.K. and described in the EPPO 2010 document seen in "side effects on honey bees" on <http://www.eppo.int/PPPRODUCTS/honeybees/honeybees.htm>

The common testing regime is that 4 colonies of 10,000 bees each are put next to one Hectare of neonicotinoid treated OSR in the U.K. (or 2 and a 1/2 Acres in the U.S.A. The only difference is the metric/imperial units used). This cannot be chance. The suspicion is that they have been adopted by the regulatory authorities from the same author, but who was this and who accepted it?

A full scale open field trial method has been used according to the EPPO 2010 guidelines. The study called "Side effects on honey bees" does not look for larval deaths at all. The field size can be as little as one hectare for 4 colonies of 10,000 bees each, which are required by the test methodology. This is unrealistic. That is 4 bees per square meter. It is worth about 5 minutes of forage per day. The bees will then go elsewhere for the rest of the day to forage on neonicotinoid free flowers. Bees forage over about 30 square kilometers (30 million square metres or 3,000 hectares) yet the regulatory test allows them only a quarter of a hectare of neonicotinoid laced OSR forage per colony.

The EPPO 2010 methodology for field tests was modified by "2013 Bees GD" by the EFSA page 213 "Design of a Field Study". Pages 215 and 216 indicate that the size of the open field study containing seed treated with Neonicotinoids can be 2 Ha. with 7 hives x 10,000 honey bees. For all practical purposes there is little difference between the two regimes. The bees, if not contained in a cage will range over 3000Ha. The burden of neonicotinoids on the bees will be (on average) 2/3000ths. of the forage available within the bees range. This is miniscule compared to reality which would require about 500Ha. rather than 2Ha.

A 2Ha. field will be foraged by the 7 hives x 10,000 honey bees for a very short time every day picking up very little neonicotinoid before foraging elsewhere.

As a scientific method it is nonsense.

The following approach needs to be adopted, being a caged small field trial. If the full field control area cannot be caged reduce the number of bees to an area that can be. The effect will be an accurate, scientific result.

OBJECTIVE

- 1. To determine the damage (if any) caused by a pesticide on honey bees.*
- 2. To determine the oil seed rape yield from 3 different regimes.*

METHOD

Erect 9# 50m long x 4.5m wide poly tunnels and cover them with bee proof netting. Cost approx. £4k. for each poly tunnel.

- 1. 3# to have oil seed rape in them whose seed has been dressed with neonicotinoid. When in flower insert mini nukes into each with a mated queen and a cup of bees.*
- 2. 3# to have oil seed rape in them whose seed has not been dressed with neonicotinoid. When in flower insert mini nukes into each with a mated queen and a cup of bees. Deploy contact insecticides as required and at night only.*
- 3. 3# to have oil seed rape in them whose seed that has not been dressed with neonicotinoid. When in flower insert mini nukes into each with a mated queen and a cup of bees.*

OBSERVE

- 1. The death curves in each colony of adult bees and larva in each poly tunnel.*
- 2. The oil seed rape yield in each poly tunnel by weight.*

THE LOGICAL CONSTRUCT

A mini nuke is a microcosm of a full colony, but must be small enough to be self-sufficient in pollen and honey within a 50m.x 4.5m. poly tunnel. A poly tunnel 100m.long would be better to ensure survival from starvation. It could be sowed with 10% of plants other than OSR to ensure a balanced diet.

It must have enough pollen and honey forage in the poly tunnel to be self-sufficient

as a closed system.

Neonicotinoids are apparently able to kill a target pest, the pollen beetle. If it does this why does it not kill other non-target pollen consuming insects such as pollinating bees? What is the difference between the insects biology that makes neonicotinoids fatal to the former, but not to the latter? When pollen beetle numbers (despite the seed dressing) reach 5 per plant it is recommended that an additional treatment with either a pyrethroid or a neonicotinoid at the green bud stage is applied. This recommendation is expected soon to be dropped to 3 beetles per plant. Good for agri-chemical profits, but not for pollinators such as honey bees.

The existence of the DEFRA/CRD regulators by approving products, allow the agri-chemical companies to privatize the profits while socializing the damage they cause. The current regulatory regime is counter-productive. It seems not to protect the public or the eco-system. The companies must be happy with the current approval regime, because it acts as a firewall against civil action against them.

A document prepared by the French Food Standards Safety Agency(AFFSA) for Thiamethoxam-based Cruiser 350 made by Syngenta Agro SAS. was carried out for Maize which bees do not visit, because it has no nectar. Maize is wind pollinated just as any other grass is. This was submitted to the AFSSA by Syngenta apparently without a "Commercial in Confidence" tag. Any similar study by Syngenta for OSR (which bees do visit) has its "Commercial in Confidence" tag still intact. Why there is a difference is puzzling, but there may be a sensible reason that is not apparent. That for maize showed no effect on bees. This is not a surprise as they do not visit it.

Page 15 of the AFSSA attachment also has the following text:

Laboratory tests. The laboratory data indicate that thiamethoxam and the metabolite CGA 322704 are highly toxic to adult bees

Thiamethoxam's toxicity for larval development was estimated using a laboratory test developed by INRA which is currently being validated.

The INRA data which is currently being validated when released in early 2013 will determine the "toxicity for larval development" and would seem to be important. It is surprising that it is not already known.

Information on the possible larval damage to honeybees by neonicotinoids appears not to be available yet must be a major point of possible damage being a neurotoxin.

From the RSPB website.

Is this talk about national bird declines just hot air?

No. As well as all these apparent disappearances of birds, there has been a serious, countrywide, decline in the numbers of many birds, including many well known and loved species such as the song thrush, skylark, lapwing and house sparrow.

This decline has been slow and gradual, rather than sudden. Most of the declining species are farmland birds. On the other hand, most woodland species such as the blue tit, nuthatch and great spotted woodpecker are still doing alright. However, declines may have started in woodland habitat also, with lesser spotted woodpecker and willow tit now red-listed because of their severe declines.

Farmland birds.....declining? Just a coincidence, surely.

Letter sent to the New Scientist by the author on 17/08/2015

Beekeepers are not surprised that the current moratorium on neonicotinoid insecticides use (a neurotoxin) in the EU has actually increased the oilseed rape (OSR) yield this year in the UK. This is not what the 6 billion dollar crop protection industry wanted to hear. They have mismanaged farmer perceptions of neonicotinoids with great skill. The "independent" agronomists that advise farmers get a percentage of the value of chemicals sold. Farmers have become lazily addicted to chemicals in the mistaken belief that no insects are better than any, even pollinators. They have been advised that non target honeybee pollinators are only worth 10% of OSR tonnage and therefore not worth worrying about, but a tightly controlled experiment conducted at the National Agriculture Research Center in Islamabad 2007-8 compared OSR plant yield in cages with honeybees compared to OSR plant yield in cages without them. There was a significant increase in all plant yield parameters from the cages with honeybees. Honeybees did not increase yield by 10%, but 80%.

To increase OSR yield a policy among farmers of mutual restraint in the use of these chemicals could be initiated, but to act alone and not use them when others will do so is pointless. Only banning them will ensure that the benefits of mutual restraint will accrue to all. The current moratorium on their use in EU needs not to be lifted as has happened in Suffolk (as an "emergency" measure), but made a permanent ban.

While there is obscurity on the side effects of neonicotinoids on farmer crop yields there is also a case to be made that the entire "open field trial" methodology (carried out by the crop protection industry, but government approved) to determine harm to pollinators is itself systemically flawed. Its methodology underestimates their negative effects on pollinators in the real world.

The EPPO 2010 guidelines for open field trials were replaced by "2013 Bees GD" approved by the EFSA. See page 213 "Design of a Field Study" pages 215 and 216 which indicates that the size of the open field study containing seed treated with neonicotinoids was now to be as little as 2 Ha, 7 hives x 10,000 honey bees. The bees, if not contained in a cage will range over 3000Ha. The burden of neonicotinoids on the bees will be (on average) 2/3000ths.of the forage available within the bees range. This is miniscule compared to reality which would require about 500Ha.rather than 2Ha. As a scientific method it is nonsense, with the tests being carried out by the chemical companies themselves quick to deploy "commercial and in confidence" on both the test protocols and the results. Obscurity follows enquiries from the public.

The existence of government approved testing regimes allows the agricultural chemical industry to privatize the profits while socializing the damage they may cause. The current regulatory regime is not working. It does not protect the public or the eco-system yet confers legitimacy on the chemicals. The companies must be

very happy with the current approval regime. It acts as a firewall against civil action being taken against them.

Neonicotinoids are a neurotoxin which if deployed systemically to seeds as a dressing are very effective against all insects, not just the flea beetle, sap suckers and pollen beetles. They are apparently less so against mammals such as humans, but the EFSA in the EU are initiating an enquiry into them as a possible cause of Dementia and Alzheimer's in humans.

Perhaps it is time to deploy the cautionary principle and ban them completely until proven safe for the benefit of both honeybees **and** ourselves

Same letter edited by New Scientist and published on 03/10/2015.

Beekeepers are not surprised that the current moratorium on neonicotinoid insecticides in the European Union has actually increased the oilseed rape yield this year in the UK (15 August, p24). Farmers have become lazily addicted to chemicals in the mistaken belief that having no insects is better than having any, even pollinators.

There is a case to be made that the “open field trials” carried out by the crop protection industry underestimate the negative effects of pesticides on pollinators in the real world. An open field area treated with neonicotinoids may be as little as 2 hectares: bees, if not contained will range over 3000Ha. Work at the National Agriculture Research Centre in Islamabad in 2007-2008 compared oilseed rape yields of plants in cages with honeybees with those in cages without them. Honeybees increased yield by 80%.

Only banning neonicotinoids will ensure that the benefits of restraint will accrue to all. The moratorium on their use in the EU should be made permanent, not lifted as has happened in Suffolk as an “emergency” measure.

Bill Summers

BAYER REVISES POSITION ON ITS NEONICOTINOIDS

It appears that Bayer has finally been forced to admit that its neonicotinoid products are causing harm to pollinators, something that the rest of us have known for a long time. If insecticides kill insects, it is indeed likely that bees, which are insects, will be killed or harmed. If they did not, as was being claimed, the mechanism needs to be explained. No such mechanism exists.

The pharmaceutical giant had initially accused the US Environmental Protection Agency (EPA) of overestimating the impact of imidacloprid on pollinators but now admits that the EPA report is ‘scientifically sound’. A preliminary risk assessment released by the EPA in early January 2016 found that that imidacloprid, one of the world’s most common pesticides, can cause honey bee populations to fall in some circumstances. The agency determined that imidacloprid in nectar at levels of 25 parts per billion or above was harmful to colonies, which have suffered an alarming decline in abundance over the past year. The company has now clarified its stance, telling the Guardian that it believes the EPA assessment is **“quite good and**

scientifically sound". A spokesman said Bayer will look to work with the EPA to reduce risks to bees. Two studies published in Nature last year cited evidence that overuse of neonicotinoid pesticides was harming bee populations. One of the studies found that bees were drawn to neonicotinoids, which are derived from nicotine, possibly similarly to how humans are attracted to nicotine. This means that bees may prefer a food source that harms their nervous system.

The EPA is in the process of reviewing the impact of three other neonicotinoids – clothianidin, thiamethoxam, and dinotefuran – as well as how other species, such as butterflies and aquatic animals, are affected by pesticides. This work is set to be unveiled in December.

The Center for Food Safety, in alliance with various beekeepers and farmers, filed a lawsuit against the EPA last week, accusing it of allowing seeds coated in neonicotinoids to be planted across 150m acres of US soil each year without proper assessments of the impact. [Could that happen in the UK?]

The Pesticide Action Network has called for the EPA to follow the path of Europe and suspend the use of imidacloprid.

Information from Catch the Buzz from Bee Culture Magazine

Cynical Question. Has Bayer something else up its sleeve ready to launch?