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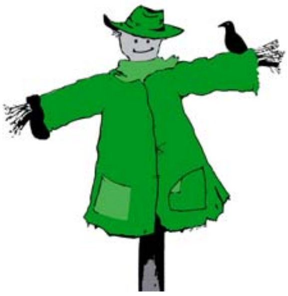

GM Contamination Briefings

Friends of the Earth

3. Gene escape

This briefing is part of a series explaining the difficulties involved in growing GM and non-GM crops together ('co-existence'), and why a strong legal framework is needed to deal with this issue. Under European law, Member States can create a legal basis for coexistence and liability, and the UK Government has now started this process. It is vital that strict laws are put into place to prevent contamination of non-GM crops and ensure that biotechnology companies are held liable for any damage caused by their products. Local and regional authorities should have the democratic right to decide whether or not GM crops are grown in their areas.

Key points

- Gene escape usually occurs via cross pollination or movement of seeds
- Effects on the environment are not known, but may include development of 'super weeds' requiring more herbicides and subsequent environmental damage
- There is very little known about the effects of gene escape on the balance of ecosystems

Causes of gene escape: cross pollination

Pollen from GM crops can be carried by the wind or insects to pollinate non-GM crops. Insects can transport pollen over considerable distances: bees can travel up to 5km when foraging (*see Briefing 4 – Bees, honey and GM crops*). The pollen beetle, a major pest of oilseed rape, is thought to be responsible for cross pollination of oilseed rape plants over 26km apart[i]. Long distance transport of pollen by wind also occurs: tree pollen has been detected on treeless Shetland, 250 km from the mainland[ii]. The voluntary guidelines used in the Farm Scale Evaluations, which may form a basis for future legislation, are clearly inadequate – the greatest separation distance stipulated is just 600m between certified seed crops for sugar/fodder beet[iii].

Cross pollination is not restricted to newly sown GM crops and neighbouring non-GM crops. Feral plants (wild crop plants), or volunteers (weed crop plants in following crops from seeds dropped at harvest) could also be sources of GM contamination. Volunteers could cause particular problems where seeds have long survival times in soil: DEFRA sponsored research suggests that some oilseed rape seeds could survive up to 16 years[iv].

Some crops can also cross-pollinate with related wild plants. Five wild relatives of oilseed rape have a high risk of hybridisation, and they are widely distributed across the UK: in many places all five species are found[v]. A recent study estimated hybridisation between oilseed rape and wild turnip would produce 23,000 hybrids per year along rivers, and 17,000 in arable areas[vi]. DEFRA sponsored research found a herbicide resistant charlock weed in a field the year after GM oilseed rape had been grown there, as part of the UK Farm Scale Evaluations. The plant contained the gene used in the GM oilseed rape grown in the trials[vii].

Causes of gene escape: physical seed movement

Physical movement of GM seeds can also lead to gene escape. Such movement can occur via farm equipment, tyres, clothing and footwear, animals, and spillage of seeds can take place anywhere from field to factory. A Université de Lille study[viii] demonstrated that long distance dispersal can occur in this manner. Weedy hybrids of commercial and wild sugar beet commonly found in fields had migrated 1500 metres. The hybrids were known to have come from seed due to their maternal genes, rather than the paternal ones carried by pollen. Had the hybrids formed from GM sugar beet, they would have spread GM material beyond the field.

Problems caused by gene escape

One problem that can arise from cross pollination is termed ‘gene stacking’, where wild plants incorporate many traits, eg tolerance to several different herbicides. This could lead to serious weed control problems for farmers. GM ‘super weeds’ may, according to English Nature, “*lead to farmers using more herbicides… potentially resulting in increased damage to biodiversity*”[ix]. In Canada, oilseed rape plants have been found with three different herbicide tolerant genes[x].

Another possibility is that plants will become stronger and fitter when they gain novel genes, becoming more competitive and invasive against other plants and disturbing the balance of ecosystems. A recent US study revealed that wild sunflowers, considered weeds by farmers, became hardier and produced 50 per cent more seeds when crossed with a GM sunflower[xi].

GM traits will be hard to detect in wild ecosystems **-** there is no monitoring of important wildlife sites for such traits, and nothing in proposals for coexistence and liability to deal with this.

Conclusion

If GM crops are to be grown commercially on a large scale, it is essential that safeguards are in place to minimise gene escape and prevent problems occurring in the long term. Many measures needed to prevent gene escape are impractical and costly, which begs the question, is it practical, cost effective or even possible to grow GM and non-GM crops together in the UK?

It is vital that a strong legal framework is put into place to prevent contamination via gene escape occurring, and ensure that liability is clear if contamination does occur.

References

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