



## Annual report on GM inspection and enforcement activities

01 April 2004 - 31 March 2005



## Contents

Executive summary	1
1 Introduction	3
2 GM legislation and regulation in the UK	5
3 The work of the GM Inspectorate during the reporting period	8
3.1 Inspections of part B deliberate release sites	8
3.2 Management audits of deliberate release consent holders	9
3.3 Audits of seed importers and producers	10
4 Case by case investigation of specific potential enforcement issues	14
5 Research and development to underpin GM inspection and enforcement	16
5.1 Detection and traceability technologies to underpin GM inspection and enforcement	16
5.2 Plasmid standards for real time PCR and UKAS accreditation of GM enforcement testing	16
5.3 Assessment of the distribution of GM material in kernel lots (KeLDA)	17
5.4 Statistical theory and analysis of GMO enforcement (STAGE)	18
6. Other activities	20
7. Forward plan 2005-06	23
8. Further information and contact details	24
Annex 1: GM research projects ongoing at CSL	25

Submitted to the Department for Environment, Food and Rural Affairs and the National Assembly for Wales September 2005

## Executive summary

1. The GM Inspectorate was established at the Central Science Laboratory (CSL) in June 2000 to ensure that, for England and Wales, the legislation concerning the escape or release of genetically modified organisms is complied with. The National Assembly for Wales has given separate authority in respect of inspection and enforcement in Wales, although there are currently no GM releases in Wales. This is our fifth report and covers the period 1 April 2004 to 31 March 2005.
2. The work of the GM Inspectorate falls into three main areas – 1) inspection of sites where genetically modified organisms have been authorised for deliberate release, 2) audits of deliberate release consent holders and 3) audits of seed producers and importers to ensure they are taking appropriate steps to prevent the adventitious presence of GM events in conventional seed. GM inspectors are appointed under part VI of the Environmental Protection Act 1990.
3. CSL has a significant track record in GM detection technology and the technical know-how and expertise of CSL scientists underpins the statutory work of the GM Inspectorate. The skills base immediately available at CSL ensures that the GM Inspectorate can respond efficiently and effectively to GM incidents that may arise under the deliberate release legislation.
4. New legislation on GM food and feed and traceability and labelling of GMOs came into force in the UK in 2004, however the GM Inspectorate does not have responsibility for enforcing this legislation. Local authorities and port health authorities are responsible for the enforcement of food safety and food standards import controls on food products, and they are the enforcement bodies for the new regulations.
5. During the reporting period there have been just two GM deliberate release trials in England, both of which were on a small scale for research purposes. At both of these sites the consent holders managed the trials in accordance with the conditions of the consents.
6. The Inspectorate has also inspected former deliberate release sites for compliance with post trial monitoring requirements, and we can report that no problems were identified in connection with the 29 sites that were visited during the reporting period. We have also monitored former deliberate release sites for compliance with cropping restrictions following the successful completion of post trial monitoring; again, the Inspectorate can report that subsequent cropping arrangements have been in accordance with conditions of consents. A total of 20 management audits have been completed in connection with current deliberate release consents, and the GM Inspectorate has generally been content with consent holders' management practices.
7. Under the GM Inspectorate's ongoing programme of audits of seed importers and producers, in the reporting period we have completed a total of 98 seed audits covering seed of winter and spring oilseed rape (31), related brassica crops (33), sugar and fodder beet and related crops (16), maize and sweetcorn

(17) and soya (1). We are able to report here that all seed companies participating in the audit were taking appropriate steps to ensure that conventional seed of these crops does not contain unauthorised GM presence. The crops included in the seed audit programme are based on an ongoing programme of risk assessment and are kept under review.

8. As in previous years, successful delivery of the field inspection programme has been dependent on effective liaison with consent holders over compliance issues such as sowing dates of trials, monitoring requirements during and after the trial period and arrangements for the disposal of harvested material. In addition the continued cooperation of the seeds industry has been vital to completion of the seed audit programmes.
9. During the reporting period two potential enforcement issues have been investigated (see section 4.1). One of these involved seed with a suspected adventitious GM presence; this was relatively straightforward to resolve and the seed lot concerned was cleared for marketing. In the second incident, for the first time the GM Inspectorate was called upon to investigate a potential enforcement issue when the import of genetically modified fish was reported. This is described in section 4.2 of the report.
10. CSL is involved in a number of research projects aimed at extending and consolidating expertise in GM sampling and detection methodology, these are discussed in further detail in this report. CSL has also participated in a number of EU-wide studies to validate GMO detection protocols for authorised GM events; these are also discussed in the report.
11. The GM Inspectorate website pages are currently being upgraded to improve accessibility to information about our work programmes and access to current and historical reports. Much of the new website is currently available on-line at [http://www.csl.gov.uk/prodserv/cons/gm\\_inspectorate.cfm](http://www.csl.gov.uk/prodserv/cons/gm_inspectorate.cfm). To enable access to the GM Inspectorate website directly (as opposed to via the CSL website) we will also have a new address in the near future; visitors will be automatically redirected to the new address.

# 1. Introduction

- 1.1 The GM Inspectorate (GMI) is based at the Central Science Laboratory, Sand Hutton, York and has authority under part VI of the Environmental Protection Act 1990 (EPA) for inspection and enforcement of the release and marketing of genetically modified organisms (GMOs) in England. This work is undertaken for the Department for Environment, Food and Rural Affairs (Defra). In England Defra is responsible for the control of the deliberate release of GMOs, for national policy on the environmental safety of GMOs, and for UK representation on European Union (EU) and international policy. The Central Science Laboratory is an executive agency of Defra, specialising in the sciences underpinning sustainable land use, safe food and environmental issues.
- 1.2 The CSL GM Inspectorate assumed responsibility for GM inspection and enforcement functions in June 2000<sup>1</sup>. This is our fifth report, covering the period 1 April 2004 through to 31 March 2005.
- 1.3 The National Assembly for Wales has given the GM Inspectorate separate authority in respect of inspection and enforcement in Wales, although there are currently no GM release sites in Wales. The Scottish Agricultural Science Agency (SASA)<sup>2</sup> is authorised by the Scottish Executive to carry out the equivalent inspection and enforcement role for Scotland.
- 1.4 The work of the GM Inspectorate falls into three key areas:
- a) inspection of part B deliberate release sites in England and Wales;
  - b) management audits of deliberate release consent holders;
  - c) monitoring, in England, for adventitious GM presence in conventional seed stocks and trials seeds.
- 1.5 This work is undertaken to ensure compliance with the legislation concerning the escape or release of GMOs, which is described in more detail in section 2 of this report. Within all of these three work areas specific issues relating to potential breaches of the relevant GM legislation may occur. These may be notified to the regulatory authority or to the GM Inspectorate by a consent holder, a seed company or by a member of the public; a GM Inspector may also identify a potential infringement in the course of undertaking statutory work. The GM Inspectorate investigates these issues on a case-by-case basis and takes action as appropriate. Details of the work undertaken in these areas are provided in section 3 of this report.
- 1.6 The GM Inspectorate operates as a key part of CSL's GM Enforcement team, within which the research and development (R&D) arm provides technical support for GM inspection and enforcement work. The R&D team comprises research scientists whose expertise lies in the development of GM detection technology, molecular marker technology, statistics and modelling, and crop-to-crop gene flow. This proactive support structure

---

<sup>1</sup> This work was formerly undertaken by the Health and Safety Executive.

<sup>2</sup> <http://www.sasa.gov.uk/gm/inspectorate/index.cfm>

ensures that the GM Inspectorate is able to respond efficiently and appropriately to any GM deliberate release incidents that may occur in England or Wales.

- 1.7 The GM enforcement R&D team participates in a number of collaborative GM-related projects including the pan-European SIGMEA (Sustainable introduction of GM crops into European agriculture<sup>3</sup>) and Co-Extra (GM and non-GM supply chains: their co-existence and traceability<sup>4</sup>) projects. CSL scientists are also active participants in the work of the European Commission Joint Research Centre (JRC) and the European Network of GMO Laboratories (ENGL). A list of GM-related projects ongoing at CSL is given in Annex 1 of this report.
- 1.8 The GM Inspectorate also works closely with CSL's team of mathematicians and statisticians. This ensures that we maintain up-to-date knowledge of the issues associated with sampling and testing for GMOs, enabling us to maximise the statistical robustness of our work and providing support for interpretation of data submitted to the Inspectorate. In addition the GM Inspectorate maintains close links with teams undertaking research into probabilistic risk assessment of GM crops, and environmental monitoring of GM crops. The GM Inspectorate offers background advice to these teams as requested and in return is able to keep abreast of wider developments in the field of GM crops.

---

<sup>3</sup> <http://sigmea.dyndns.org/>

<sup>4</sup> <http://www.coextra.org/>

## **2. GM legislation and regulation in the UK**

- 2.1 In the European Union the deliberate release of GMOs is restricted under EU Council Directive 2001/18/EC on the deliberate release into the environment of genetically modified organisms<sup>5</sup>. This Directive provides a harmonised approach across all the EU member states to the assessment of risks to the environment and to human health in relation to the release and marketing of GMOs. In Great Britain Directive 2001/18/EC has been implemented by the Environmental Protection Act 1990 (part VI) and regulations made under that Act (e.g. in respect of England, the Genetically Modified Organisms (Deliberate Release) Regulations 2002 (S.I. 2002/2443)). The Department for Environment, Food and Rural Affairs (Defra), the Scottish Executive and the National Assembly for Wales have functions and responsibilities in relation to the deliberate release of GMOs.
- 2.2 The regulatory regime for GMOs has two key objectives, to protect human health and the environment and to ensure consumer choice. The enforcement regime must be effective, proportionate to risk, cost effective and promote public confidence. Under section 114 of the Environmental Protection Act 1990, the members of the GM Inspectorate at CSL have been appointed as inspectors for the purpose of the inspection and enforcement of the legislation concerning deliberate release of GMOs in England and Wales (2001/18/EC). Clinical trials are inspected and enforced by the Health and Safety Executive. Agreements are in place with Defra and the National Assembly for Wales concerning the functions of the GM Inspectorate. The GM Inspectorate currently comprises five full-time staff.
- 2.3 EU Directive 2001/18/EC sets out measures for releasing a GMO for research or development purposes (part B) and for placing a GMO on the market (part C). However, it is important to note that under new EU regulations different application routes for commercial release of GMOs are now possible, depending on the intended use of the GMO, these are discussed in more detail in sections 2.6 – 2.9 below.
- 2.4 GMOs must not be released into the environment until a thorough assessment of the GMO that is proposed for release has been undertaken. If authorisation is given it will be accompanied by specific conditions detailed within the consent to release the GMO, which are designed to safeguard against any risks to human health and the environment.
- 2.5 In the UK consent to release a GMO under part B of Directive 2001/18/EC may be obtained by submission of a detailed application, which includes a thorough risk assessment, to the Northern Ireland, England, Wales and Scotland (NIEWS) GM Unit based at Defra. This unit administers all applications (part B and part C) for the release of a GMO in the UK and coordinates consultation on applications by other EU Member States.

---

<sup>5</sup> In the EU, the contained use of genetically modified organisms is controlled by EU Directive 98/81/EC of 26 October 1998 on the contained use of genetically modified micro-organisms, and in the UK the Genetically modified organisms (contained use) regulations 2000 (S.I. 2000/2831), which is enforced by the Health and Safety Executive.

NIEWS also provides the Secretariat to the Advisory Committee on Releases to the Environment (ACRE). ACRE is an independent advisory committee composed of leading scientists whose main function is to advise UK Ministers and the devolved administrations on the risks to human health and the environment from the release and marketing of GMOs<sup>6</sup>. ACRE reviews all part B applications for consent to release a GMO and, if satisfied that the proposed release will have no adverse effects on human health or the environment, the Committee will advise that the consent may be issued. ACRE's advice may include recommendations for monitoring following completion of the trial, and other aspects of management of the release. Authorisation to place a GMO on the market under part C of Directive 2001/18/EC is given at EC level after extensive consultation by the competent authorities of the EU member states. ACRE also reviews and advises on all part C applications for the UK.

- 2.6 In April 2004 new EU regulation on GM food and feed (EC/1829/2003) came into force in the European Union. This regulation provides for a single Community procedure for the new authorisation of all food and feed derived from a GMO, of the GMO itself as a food or as a feed, and of food or feed containing the GMO. The European Food Safety Authority<sup>7</sup> manages the application and authorisation procedure centrally. Business operators may now file a single application for the GMO and all its uses; a single risk assessment is performed and a single authorisation is granted for a GMO and all its uses including cultivation, importation and processing into food/feed or industrial products. The regulation also requires labelling of all GM food and feed which 1) contains or consists of GMOs (e.g. GM soya), 2) is produced from GMOs (e.g. glucose syrup from maize starch) or 3) contains ingredients produced from GMOs (e.g. GM tomato paste). The regulation makes provisions for tolerance of the technically unavoidable presence of authorised GMOs without the need to label. In England the regulation has been implemented by the Food Safety Act and regulations made under that Act (the Genetically Modified Food (England) Regulations 2004 (S.I. 2004/2335), and the Genetically Modified Animal Feed (England) Regulations 2004 (S.I. 2004/2334)). The Food Standards Agency has regulatory responsibility for this area. Local authorities and port health authorities are responsible for the enforcement of food safety and food standards import controls on food products, and they are the appointed enforcement bodies for the new Regulations<sup>8</sup>.
- 2.7 Applicants seeking authorisation for cultivation of a GM food or feed may still choose to submit a separate application for authorisation to cultivate the GMO under part C of Directive 2001/18/EC. However, it is anticipated that part C of Directive 2001/18/EC will be used mainly for applications such as flowers and industrial products that will not enter the food or feed chain.
- 2.8 New EU regulations on traceability and labelling of GMOs (EC/1830/2003) also came into force in April 2004. This regulation establishes a harmonised

---

<sup>6</sup> See <http://www.defra.gov.uk/environment/acre/index.htm>

<sup>7</sup> See [http://www.efsa.eu.int/science/gmo/catindex\\_en.html](http://www.efsa.eu.int/science/gmo/catindex_en.html)

<sup>8</sup> See [http://www.food.gov.uk/enforcement/imports/enforce\\_authorities/](http://www.food.gov.uk/enforcement/imports/enforce_authorities/)

EU system of documentation to account for and identify GM products throughout the supply chain, with the objective of facilitating accurate labelling. For certain products, a system of unique identifier codes will be used to allow access to specific information on GMOs from a community register of GM food and feed. In England the regulation has been implemented by the Environmental Protection Act and regulations made under that Act (the Genetically Modified Organisms (Traceability and Labelling) (England) Regulations (S.I. 2004/2412)). Defra has regulatory responsibility for this area and the local authorities and port health authorities are the designated enforcement bodies.

- 2.9 Full details of the new regulations can be found on the Food Standards Agency website (<http://www.food.gov.uk/gmfoods/>) and the Defra website (<http://www.defra.gov.uk/environment/gm/eu/index.htm>).

### **3. The work of the GM Inspectorate during the reporting period**

#### **3.1 Inspections of part B deliberate release sites**

- 3.1.1 The GM Inspectorate carries out field inspections to ensure compliance with part B consents granted under EU Directive 2001/18/EC. During inspection visits GM Inspectors must establish that each release is in accordance with conditions described in the consent, for example separation distances from related crops, presence and size of pollen barriers, area of GM release and control of volunteers/flowering plants (as applicable). In the period following harvest of experimental releases the GM Inspectorate also visits a proportion of the release sites to ensure that post-trial monitoring procedures, such as control of volunteers or subsequent cropping requirements, are being undertaken in accordance with the conditions of the consent.
- 3.1.2 Draft reports on growing crop inspection visits are produced and submitted to Defra within an agreed framework of five working days. A period of 20 calendar days then follows in which the consent holder and NIEWS have the opportunity to comment on the factual details of the report. Final field inspection reports are then placed on the public register and on the GM Inspectorate website at:  
[http://www.csl.gov.uk/prodserv/cons/gm\\_insp/delibrelease/exptreleases.cfm](http://www.csl.gov.uk/prodserv/cons/gm_insp/delibrelease/exptreleases.cfm).
- 3.1.3 During the reporting period there have been 2 experimental deliberate releases in England, both of which have been small scale research and development trials. Consent 03/R29/04 involved the release of genetically modified peas (*Pisum sativum* ssp. *sativum*) in order to determine the expression of a T11-GUS transgene under drought conditions. Consent 04/R39/1 was designed to evaluate the environmental impact of phenazine-expressing *Pseudomonas fluorescens* (a soil bacterium) on other soil-dwelling microorganisms, when applied to non-GM wheat plants. Details of both of these consents can be found on the Defra website at <http://www.defra.gov.uk/environment/gm/regulation/consents/index.htm>. The GM Inspectorate carried out a growing crop inspection at each of these sites; in addition a sowing inspection was undertaken at the pea site and a harvest inspection at the *Pseudomonas*/conventional wheat site. The *Pseudomonas* release was the first example of a genetically modified micro-organism that the GM Inspectorate has dealt with, however the underlying principles of inspection were the same for this as for a GM crop release. The conditions of the consents were met in all cases for both consents.
- 3.1.4 The GM Inspectorate has also made 29 post-trial inspection visits to previous release sites to check for compliance with post-trial management conditions. In addition 5 visits were made in relation to specific investigations. At all of the sites no risks to human health or the environment were identified and no further action was taken.
- 3.1.5 A number of former deliberate release sites have now reached the end of the formal post-trial monitoring period but still have a requirement in the consent

not to plant certain crops. To ensure compliance the GM Inspectorate contacted the respective growers, trials officers and consent holders (as appropriate) for verbal assurance that subsequent cropping restrictions were being observed. In all cases this was affirmed. The Inspectorate also carried out inspections of a proportion of these former deliberate release sites (a total of 8 visits) to confirm compliance at first hand. In all cases the subsequent cropping arrangements were in accordance with the consent conditions.

### **3.2 Management audits of deliberate release consent holders**

- 3.2.1 The Inspectorate has an ongoing programme to audit current consent holders to ensure that they are aware of their responsibilities as the holder of a consent to release a GMO. These audits include all holders of active consents, i.e. those with release sites currently being used for trials, and those who are still required to undertake monitoring at former trial sites.
- 3.2.2 The purpose of the management audit is to verify that the correct procedures and protocols are in place to ensure appropriate planning and operation of GM field trials, and to verify that the conditions laid down in the release consents are known throughout the management chain and are effectively implemented *in situ*. Consent holders for current field releases are also required to provide evidence to demonstrate that adequate steps have been taken to ensure that only those GM events authorised by the consent are released. Further checks are made on the effectiveness of post-trial management procedures such as monitoring for volunteers and correct post-trial cropping, as detailed in the consent.
- 3.2.3 Nine consent holders responsible for a total of 20 current part B consents were audited to review their management systems and protocols. On the basis of information provided by the consent holder the Inspectorate found that standards, protocols and dissemination of information through the various management chains was generally good although improvements were suggested in a few cases. Management audit reports are submitted to Defra to provide assurance that deliberate releases are being managed appropriately.
- 3.2.4 Consents to release a GMO are issued under section 111 of the Environmental Protection Act and are accompanied by specific conditions that require the consent holder to monitor the release during the trial period and, in most cases, for a specified period after termination of the trial. The schedule to the consent will specify limitations and conditions of the consent as is appropriate to the particular release, including time periods for the submission of monitoring reports to the Secretary of State (Defra). In the forthcoming year the GM Inspectorate will assume administrative responsibility for consent holder reports that are submitted to Defra in accordance with section 111 of the EPA. All management audits in the 2005-06 programme have been scheduled to take place approximately 1 month in advance of each consent holder's reporting date as specified in

their consent; the GMI can therefore advise on presentation of monitoring information and ensure good liaison between Defra and the consent holders.

### **3.3 Audits of seed importers and producers**

- 3.3.1 Under Part VI of the Environmental Protection Act 1990, the importation, acquisition, release and marketing of genetically modified organisms are prohibited unless the requirements for carrying out a risk assessment, giving notification and obtaining a consent are satisfied. Before marketing seed UK producers and importers of seed material should therefore take adequate steps to minimise the risk of adventitious GM presence in conventional seed. The GM Inspectorate conducts audits of seed importers and producers and provides guidance to assist them in fulfilling these duties. The audits are voluntary and are intended to help companies ensure that they have the appropriate procedures in place and that these are suitably documented. The audit includes seed that is to be marketed for commercial production and seed intended for trial purposes. The audits are undertaken on behalf of the Plant Variety Rights Office and Seeds Division (PVS) of Defra.
- 3.3.2 The audit process involves a systematic assessment of the information presented by seed companies regarding the provenance of seed that they are marketing in England (and Wales). This information may be supplied in the form of letters of assurance detailing the production history of the seed, together with the systems or protocols that are in place to minimise the risk that adventitious GM presence will be acquired during production, harvesting and processing. Additional information may also be provided from polymerase chain reaction (PCR) or other testing that has been undertaken on seed crops or individual lots. It is usual for a combination of both letters of assurance and testing results to be presented.
- 3.3.3 The GM Inspectorate produces guidance documents for each crop species included in the audit programme, these are reviewed twice yearly in advance of the spring and winter audit programmes. Our guidance documents provide seed producers and suppliers with details of the information they should seek to provide for the seed they are marketing. In particular these advise on the key criteria that letters of assurance and PCR testing of seed (in terms of sampling, testing matrices and sensitivity) should meet. Copies of the current crop guidance documents are available on the GMI website at: [http://www.csl.gov.uk/prodserv/cons/gm\\_insp/auditprog/cropguidance.cfm](http://www.csl.gov.uk/prodserv/cons/gm_insp/auditprog/cropguidance.cfm).
- 3.3.4 Some seed companies do not process their own seed but employ the services of external companies. In order to assist these companies to gain appropriate assurances from the companies that process their seed, the GM Inspectorate has developed guidance specifically aimed at processors. These are currently being distributed to seed companies as part of the spring 2005 audit programme. The guidance for processors is also available on our website at: [http://www.csl.gov.uk/prodserv/cons/gm\\_insp/auditprog/cropguidance.cfm](http://www.csl.gov.uk/prodserv/cons/gm_insp/auditprog/cropguidance.cfm).

- 3.3.5 Since its inception the seed audit programme has focussed on seed of maize (including sweetcorn), oilseed rape (winter and spring), sugar beet, fodder beet and soya. These conventional seed crops have been targeted because genetically modified varieties of these crops are grown both commercially and in deliberate release trials in many seed producing countries around the world and therefore there is a risk that the adventitious presence of GM seed in conventional seed of these crops may occur.
- 3.3.6 In spring 2004 the list of species included in the audit was extended to include crops that are related to oilseed rape (*Brassica napus*, *B. rapa*, *B. juncea* and *B. oleracea*) and related to sugar beet (*Beta vulgaris ssp. cicla* and *B. vulgaris ssp. vulgaris*). The decision to include these crops in the audit was taken by Defra (PVS) in 2003 based on an assessment of the information available concerning worldwide releases of GM *Brassica* and *Beta* crops that can either cross pollinate to some extent with the conventional crops under field conditions, or for which there is significant activity by breeders and biotechnologists in producing GM varieties of these species. This extension of the audit has increased significantly the number of seed companies that are now audited relative to previous years; in addition many of the companies already participating in the audit programme produce some of the additional crops, hence the total number of audits has risen noticeably.

#### **Seed audits**

- 3.3.7 During the reporting year the GM Inspectorate carried out a total of 98 seed audits of seed importing/producing companies. The audits fall into the following categories:
- 19 winter oilseed rape
  - 12 spring oilseed rape
  - 33 other brassicas
  - 4 sugar beet
  - 12 fodder beet (including other *B. vulgaris spp*)
  - 17 maize / sweet corn
  - 1 soya
- 3.3.8 Summary tables of the results of the seed audit were published on the GM Inspectorate's website in May 2004 (2003 winter oilseed rape programme) and November 2004 (2004 spring sown crops programme). Prior to publication of the reports, seed companies were given 20 calendar days to comment on the factual content of the tables.
- 3.3.9 The GM Inspectorate found that all seed companies participating in the audit were taking appropriate steps to ensure that conventional seed does not contain unauthorised GM presence. It was not necessary to recall or destroy any seed because of an unauthorised adventitious GM presence.
- 3.3.10 Seed audit summary tables are available at:  
[http://www.csl.gov.uk/prodserv/cons/gm\\_insp/auditprog/auditreports.cfm](http://www.csl.gov.uk/prodserv/cons/gm_insp/auditprog/auditreports.cfm).  
The summary tables for spring 2004 show that ten companies known to be

producing seed covered by the audit programme elected not to participate in the audit (the tables for winter 2004 show that nine companies chose not to participate). However, we believe that that the audit still achieves comprehensive coverage for these crops.

- 3.3.11 Note added at publication: summary tables of the results of the 2004 winter oilseed rape programme were published in June 2005. All seed companies participating in the audit were taking appropriate steps to ensure that conventional seed does not contain unauthorised GM presence. It was not necessary to recall or destroy any seed because of an unauthorised adventitious GM presence. The seed audit summary tables for the winter 2004 audit are available at: [http://www.csl.gov.uk/prodserv/cons/gm\\_insp/auditprog/auditreports.cfm](http://www.csl.gov.uk/prodserv/cons/gm_insp/auditprog/auditreports.cfm); these show that nine companies known to be producing seed covered by the audit programme elected not to participate in the audit.

#### **Desk-based risk assessments**

- 3.3.12 In the reporting year the GM Inspectorate has completed three risk assessment reports for Defra (PVS). These are done to maintain current awareness regarding GM releases worldwide and to ensure that the seed audit programme covers an appropriate range of crops. New studies were completed to assess the risks of adventitious GM presence in UK conventional seed of alfalfa (lucerne) and clover, and an update of the grasses study undertaken in December 2003 (GM Inspectorate annual report 2003-04, section 2.3.4). The desk studies concluded that, at the time of publication (December 2004), there was not a significant risk of adventitious GM presence in seeds of these crops produced or imported into the UK.
- 3.3.13 The GM Inspectorate has an ongoing programme of monitoring publicly available GM databases and websites to ensure that we maintain awareness of the genetic elements that have been released worldwide, and therefore the elements that should be included in seed companies' analytical testing. In addition this enables us to keep a close watch on worldwide releases and to identify crops that may require a more detailed risk assessment. Commencing the reporting year 2005-06 reports will be submitted to Defra (PVS) quarterly, summarising trends in GM releases worldwide and highlighting any areas of concern to the UK seeds industry that might benefit from further investigation.

#### **GM seed audit information database**

- 3.3.14 In February 2005 the GM Inspectorate secured funding for development of a relational, web-enabled database to hold all seed audit information. The database will facilitate direct entry of seed lot information at seed audits and enable automatic cross-checking of this information with other seed companies' records where necessary. The funds allow for each inspector to have a laptop computer that will be taken to all seed audits and which will connect with the central database (held on the CSL server) using GPRS (general packet radio service) technology. Ultimately seed companies will be able to enter their own data directly should they wish to do so, thus

minimising the time that each audit should take. The database will facilitate rapid cross-checking of individual seed lots, generate seed audit reports and seed audit summary tables, thus further strengthening the robustness of the audit and saving GM inspectors considerable follow-up time for each audit undertaken.

- 3.3.15 The database is being designed and developed by CSL's IT department and will be piloted on a small scale during the winter 2005 audit programme. CSL is very experienced in the development of such databases and we are confident that all inspectors will be using the new system in the spring 2006 audit. Direct access for seed companies from the GM Inspectorate website should follow in summer 2006. Tight security measures are being put in place to ensure that data cannot be accessed by anyone outside of the GM Inspectorate, and where companies access the database directly they will only be able to view the information that they have entered. We will be writing to seed companies directly in the near future with further details of the database and how we anticipate it will make their participation in the audit less time consuming.

## **4. Case by case investigation of specific potential enforcement issues**

During the reporting year the GM Inspectorate has investigated two incidents for which there might have been enforcement issues. Details are given below (4.1 and 4.2). There have been no incidents within the GM deliberate release programme. The GM Inspectorate has not carried out any enforcement sampling or testing in the reporting period.

### **4.1 Detection of unauthorised GM events in seed**

4.1.1 During the current reporting year a seed company contacted the GM Inspectorate to inform us that they had received a positive GM test result for seed included in the spring 2004 audit programme. The GM Inspectorate reviewed the testing that had been undertaken and, having identified some problems with the test regime, advised the seed company to commission further testing on the original seed samples. The production history of the seed was also investigated thoroughly to assess the potential for the seed to have acquired a GM presence. Whilst the investigation was ongoing the company agreed to halt sales of the suspect seed lot and made arrangements to trace seed already marketed. On reviewing further test results and the production history of the seed, the GM Inspectorate concluded that the seed did not contain an adventitious GM presence and that the company could continue to market the seed.

### **4.2 Suspected GM fish**

4.2.1 In November 2004 the GM Inspectorate was informed that a consignment of GM tropical fish was due to arrive from Malaysia into England at one of the country's main airports on a specific date. Very little information was available about the consignment, but it was believed to be fluorescent zebra fish. While EU Directive 2001/18/EC provides a framework for authorisation of the release and marketing of GM fish in EU member states, there are currently no GM fish authorised for placing on the market in the EU. Under the GMO (Deliberate Release) Regulations and the Environmental Protection Act, the import and release of GM fish is prohibited without first obtaining authorisation to do so. The fish imports would, therefore, have been illegal.

4.2.2 It was established that the fish were not being imported for research purposes and the GM Inspectorate assumed responsibility for trying to trace and intercept the fish with the scant information that was available. The GMI pursued a number of lines of investigation in England and Malaysia and liaised with the State Veterinary Service at Heathrow and Manchester airports. A consignment meeting the description was not identified. Lines of investigation outside of the UK were not productive and there have been no reports of GM zebra fish being marketed in the UK, suggesting that this may have been a false alert.

4.2.3 No further incidents of this type have been reported but the GM Inspectorate is currently following the incident up with the Fish Health Inspectorate (FHI) based at the Centre for Environment, Fisheries and Aquaculture Science (CEFAS)<sup>9</sup>. We have secured funds to work with the FHI on a small project to scope the likelihood of the entry of GM fish to the UK, their potential routes of entry, the risks they may pose to the UK, and the ease with which we could develop molecular technology for the detection of GM fish.

---

<sup>9</sup> CEFAS is an executive agency of Defra (<http://www.cefas.co.uk/homepage.htm>).

## **5. Research and development to underpin GM inspection and enforcement**

### **5.1 Detection and traceability technologies to underpin GM inspection and enforcement**

5.1.1 Defra GM Policy, Science and Regulation Unit commissioned four projects with the GM Enforcement team at CSL to support development of sound, science-based and expedient enforcement of the GM deliberate release legislation by the GM Inspectorate. The research was carried out between 2003 and 2005 in the following four discrete but complementary areas:

- a. Improved PCR primer sets for plant GM event identification.
- b. A rapid protocol for isolation and DNA sequencing of GM event flanks.
- c. Investigation of the effect of GM genotype on real-time PCR GM quantification.
- d. Molecular methods for oilseed rape variety identification and GM traceability.

5.1.2 The key outputs of the research include: i) a set of 96 PCR primers capable of identifying 90% of GM elements in released events; ii) a rapid protocol for the amplification, isolation and DNA sequencing of GM event flanking sequences; iii) detailed data on the performance of real-time PCR in relation to the variable copy number of GM events in different maize kernel tissues; and iv) a new DNA marker system for the identification of oilseed rape varieties for use in the study of GM coexistence and traceability. The completion of this work provides Defra and the GM Inspectorate with assurance that methodologies are available to characterise GM events that have been created utilising conventional technology, but which cannot be immediately characterised as a known GM event.

5.1.3 The full report from this project is currently being peer-reviewed by Defra and will be published at the earliest opportunity on the R&D pages of the GM Inspectorate website at <http://www.csl.gov.uk/gmresearch> and on the Defra website at <http://www.defra.gov.uk/environment/gm/research/index.htm>.

### **5.2 Plasmid standards for real time PCR and UKAS accreditation of GM enforcement testing**

5.2.1 In order to enforce GM legislation for food, feed and seeds effectively, testing laboratories must have access to reference materials that enable accurate detection and quantification of GM events that are approved for marketing in Europe. For example, legislation introduced in April 2004 (EC/1829/2003 and EC/1830/2003) requires member states to test for GM presence in non-GM grain and feed and foodstuffs and enforce labelling when EC thresholds are exceeded. However, only a small number of certified reference materials are available for GM testing from the Institute for

Reference Materials and Measurements (IRMM)<sup>10</sup> (EU Joint Research Centre). These are soya and maize flour standards that are produced on a percentage weight for weight basis and are of limited application, being suitable only for qualitative testing. This is clearly restrictive to gaining accreditation for testing procedures.

- 5.2.2 The need for adequate reference standards is therefore two-fold: firstly qualitative PCR standards are required to act as positive controls for the identification of authorised and unauthorised GM events; and secondly, quantitative standards are required to construct standard curves for GM DNA and total plant DNA to enable the absolute quantification of GM, thereby ensuring compliance with labelling requirements for authorised GM events. Plasmid standards are one option for fulfilling these requirements. In 2003 Defra therefore commissioned the GM Enforcement team to undertake a project with the aims of: 1) developing reliable plasmid-based identification and calibration standards for the PCR testing of GM enforcement samples, and 2) producing validation data suitable for accreditation by UKAS<sup>11</sup> to the BS EN ISO/IEC 17025 standard.
- 5.2.3 The work was commissioned to support the GM Inspectorate and increase the repertoire of testing methods available with the aim of progressing GM quantification. In addition the gaining of UKAS accreditation with real time PCR would put CSL on an even footing with other enforcement laboratories throughout the EU. The work has recently been completed and the final report is in preparation; this will then be peer-reviewed for Defra. The full report will be published at the earliest opportunity on the R&D pages of the GM Inspectorate website at <http://www.csl.gov.uk/gmresearch> and on the Defra website at <http://www.defra.gov.uk/environment/gm/research/index.htm>.

### **5.3 Assessment of the distribution of GM material in kernel lots (KeLDA)**

- 5.3.1 This project was organised by the Biotechnology and GMOs unit of the EC Joint Research Centre (JRC, Ispra, Italy) with the objectives to:
- assess the distribution of GM material in kernel lots imported within EU member states;
  - evaluate currently used sampling strategies for the detection of GM material in lots of bulk raw materials;
  - provide recommendations for implementing sampling strategies.
- 5.3.2 The role of the GM Inspectorate was to sample three bulk consignments of whole soya at the first entry point to the UK. The samples were forwarded to the IRMM to be homogenised and ground, and were subsequently returned to researchers at CSL for qualitative testing by PCR for the presence of GM events.

---

<sup>10</sup> [http://www.jrc.cec.eu.int/default.asp@sidsz=our\\_organisation&sidstsz=irrm.htm](http://www.jrc.cec.eu.int/default.asp@sidsz=our_organisation&sidstsz=irrm.htm)

<sup>11</sup> United Kingdom Accreditation Service. The sole national accreditation body recognised by government to assess, against internationally agreed standards, organisations that provide certification, testing, inspection and calibration services.

- 5.3.3 The first shipment was sampled in May 2003 (GM Inspectorate Annual Report 2003-04, section 4.2). A second shipment was identified for sampling in June 2004 containing identity preserved soya from Canada; the ship docked and discharged its consignment at the port of Tilbury, London. A GM Inspector (licensed seed sampler) carried out incremental systematic sampling from the moving conveyor belt as it entered the building housing the silos. The grain samples were forwarded to the IRMM for homogenisation and grinding, and then returned to CSL for qualitative PCR testing for the presence of GM events following a standardised protocol. Due to the infrequent import of whole soya into the UK, and the difficulty in persuading companies to participate in the project, it was not possible to identify a third shipment to sample.
- 5.3.4 The project leader is currently analysing results from all project participants and will publish the findings of the study in due course. CSL's participation in this project was funded by Defra. When the JRC releases the final report, CSL's report will be published on the GM Inspectorate website at <http://www.csl.gov.uk/gmresearch> and on the Defra website at <http://www.defra.gov.uk/environment/gm/research/index.htm>

#### **5.4 Statistical theory and analysis of GMO enforcement (STAGE)**

- 5.4.1 In March 2004 Defra commissioned CSL to research the theory and practice of sampling and detection for GMOs and to develop an enhanced understanding of the statistical confidence that we can have in results obtained. The project was completed in January 2005 and drew together practical experience, data and statistical theory to address the scenarios commonly encountered in the work of the GM Inspectorate. CSL's maths and statistics team led the project working closely with scientists in the GM Enforcement team, the GM Inspectorate and the commercial GM testing team. The output enables us to state clearly and with supporting evidence the confidence we have in the whole GMO testing process and will inform strategies to deal rationally with potential enforcement situations such as re-tests and "false positives".
- 5.4.2 A novel statistical simulation model has been developed that combines sampling and testing for GMOs in one framework, incorporating the uncertainties integral to each phase. This model offers policy makers and regulators an evidence-based tool that can be used to inform decision taking. The model has been used to critically review the performance of current practice in sampling and testing to detect reliably the presence of genetic modification (GM) in oilseed rape at permitted thresholds under a range of commonly encountered situations.
- 5.4.3 The most important conclusions to be drawn from the study are that the reliability of a result for the detection of the presence of GM seeds is a function of both analysis and sampling, and that the fitness for purpose of a sampling plan is dependent on the performance of the detection system and *vice versa*. The modelling tool developed draws together the statistics of

sampling and the statistics of detection by PCR to enable users of results to reach objective well-informed conclusions about the reliability of results, and to enable the design of fit-for-purpose measurement (sampling plus analysis) systems.

- 5.4.4 The project report is currently being peer-reviewed by Defra. The full report will be published at the earliest opportunity on the R&D pages of the GM Inspectorate website at <http://www.csl.gov.uk/gmresearch> and on the Defra website at <http://www.defra.gov.uk/environment/gm/research/index.htm>. In addition a paper will shortly be submitted for publication in a peer-reviewed journal.

Annex 1 of this report provides details of other GM-related research ongoing at CSL.

## **6. Other activities**

### **6.1 Provision of technical support**

- 6.1.1 From September 2004 to January 2005 a member of the GM Inspectorate was seconded to Defra GM Policy, Science and Regulation Unit to assist with development of proposals for UK policy on co-existence measures. These measures are aimed at ensuring that conventional crops, organic crops and GM crops can be cultivated alongside one another while maintaining their integrity. The GM inspector was able to use his extensive experience of agriculture and agronomy to contribute to a series of workshops with specific stakeholders, and subsequent one-to-one discussions with farmers across the UK. Farmer's views were sought on measures such as notification, separation distances, use of machinery, volunteer control and use of a GM register. A report was prepared for the Defra GM crops policy team outlining some of the challenges that agriculture may face with coexistence, key concerns of farmers and recommendations on how to ensure that, agriculturally, coexistence can be successfully achieved. A synopsis of the consultation visits to farmers and agricultural contractors is available on the Defra website at: <http://www.defra.gov.uk/environment/gm/crops/convisits.htm>.

### **6.2 GM Enforcement Liaison Group**

- 6.2.1 In October 2004 Defra and the Food Standards Agency established a small working group to discuss enforcement issues in relation to Directive 2001/18/EC, the new food and feed regulations (EC/1829/2003 and EC/1830/2003), transboundary movement regulations (EC/1496/2003) and any future GM legislation. The group has been set up to ensure a consistent and effective approach to GM enforcement across government departments and enforcement bodies, and to establish proposed actions that would be taken in response to any specific incidents. The GM Inspectorate is a member of this group; other members include the devolved administrations, the GM Inspectorate for Scotland, the Local Authorities Coordinators of Regulatory Services (LACORS), the Association of Port Health Authorities (APHA) and the Health and Safety Executive. It is anticipated that the group will meet once a year to exchange experiences of enforcement issues, or on an *ad hoc* basis in response to specific incidents.

### **6.3 European Enforcement Project**

- 6.3.1 The GM Inspectorate continued to participate in the European Enforcement Project (EEP). This project, for which formal funding ceased in June 2003, was specifically focused on inspection issues in relation to GMOs both in contained use and deliberate release. Members include inspection personnel from EU member countries as well as from Norway and Switzerland, and in recent months new member states and accession countries have also joined the project. No project meetings were held in the reporting period, however a meeting is scheduled for 26 and 27 May 2005 and the GM Inspectorate will present a paper on the seed audit programme

that we undertake for Defra. One of our primary aims for the meeting is to gather clear information on the procedures that are in place in other EU member states to deal with adventitious GM presence in seed.

## **6.4 Participation in GMO testing validation studies**

- 6.4.1 The EC Joint Research Centre (JRC) acting as the Community Reference Laboratory and in collaboration with the European Network of GMO Laboratories, directs collaborative studies to assess the performance of event-specific methods to detect and quantify transformation events that have been submitted for authorisation under regulation EC/1829/2003. On the basis of the results of the validation studies it is the role of the JRC, as the Community Reference Laboratory, to state whether or not it considers the method that has been validated as fit for the purpose of regulatory compliance. Between January and June 2004 CSL participated in three validation exercises for maize events TC1507, NK603 and GA21.
- 6.4.2 Difficulties with interpretation of the Europe-wide results returned for GA21 led the JRC to consult experts within the CSL Proficiency Testing Group<sup>12</sup> who provided additional statistical interpretation of the collated data to ensure the method was fit for purpose. The results of the JRC collaborative studies are publicly available at <http://gmo-crl.jrc.it/>. CSL's acknowledged expertise in real-time PCR and quantitative GMO analysis has ensured that CSL will also be included in a study relating to the haploid genome copy number certification study being coordinated by the JRC Institute for Reference Materials and Measurement.

## **6.5 Training activities**

- 6.5.1 The GM Inspectorate participates in a number of programmes aimed at knowledge dissemination and harmonisation, and has delivered training in GM inspection and enforcement as outlined below:
- 12 – 16 July 2004: training of 12 regulators from developing countries (chiefly African countries) in 'GM Crops: detection, regulation and monitoring'. Training was delivered jointly with the University of Leeds and was funded by the UK Department for International Development.
  - 19 – 22 July 2004: training of New Zealand government regulator in practical aspects of GM inspection and enforcement. Funded by the New Zealand Ministry of Agriculture and Forestry Biosecurity Unit.
  - 29 November to 03 December 2004: training of 2 government regulators from the Maltese Environment and Planning Authority, (Environment Protection Directorate) in theory and practical aspects of GM inspection and enforcement. Funded by the Maltese Environment and Planning Authority.
  - In May 2005 members of the GM Inspectorate will be delivering presentations on GM Regulation in the EU, and sampling and testing

---

<sup>12</sup> CSL runs the genetically modified material analysis scheme (gemma), an international proficiency testing scheme for laboratories that carry out GMO testing for food and feed (<http://ptg.csl.gov.uk/gemma.cfm>).

for GMOs as part of an EC-funded twinning programme with the Turkish Ministry of Agriculture and Rural Affairs.

## **6.6 Conferences**

6.6.1 Members of the GM Inspectorate have attended the following meetings during the reporting period:

- European Science Foundation. Scientific Programme on Assessment of the Impacts of Genetically Modified Plants: Measuring and monitoring the impact of GMOs. 31 March - 01 April 2004, Cambridge, UK.
- Plenary meeting of the European Network of GMO Laboratories (ENGL). 9 – 10 September 2004, Ispra, Italy.
- ISTA Workshop on Statistical Aspects of GMO Detection. 17 – 19 November 2004, St. Louis, Missouri, USA.
- XIII<sup>th</sup> Annual Molecular Biology Seminar: Molecular Tools in Seed, Feed and Food analysis. Hosted by Eurofins. 24 - 25 February 2005, Paris, France.

## **6.7 GM Inspectorate website**

6.7.1 The GM Inspectorate website has been redesigned as we were aware that the old format was difficult to access and to navigate around. Most of the new pages are already live and we are confident that visitors to the GM Inspectorate's new website will find that it is now easily accessible and that all information relating to our work can be quickly located from the home page. We are working on further improvements to support quick searches of the data. We will also shortly have a new website address that will facilitate direct access to our pages; visitors to [http://www.csl.gov.uk/prodserv/cons/gm\\_inspectorate.cfm](http://www.csl.gov.uk/prodserv/cons/gm_inspectorate.cfm) will be automatically redirected to the new address.

## **7. Forward plan 2005-06**

- 7.1 There has been a significant reduction in the number of deliberate release field trials in the UK recent years. There were no applications for new releases in autumn 2004 or spring 2005. A list of active consents (i.e. consents under which trials can still be planted) is available on the Defra website at <http://www.defra.gov.uk/environment/gm/regulation/trials.htm>. For all consents listed on this site, 2005 was the last permissible year of planting.
- 7.2 Compliance with post-trial restrictions remains to be monitored at a number of former GM deliberate release sites, as does compliance with subsequent cropping restrictions. The GM Inspectorate will visit a proportion of these sites in the forthcoming year. We will also continue the programme of management audits to ensure that good management practice remains in place until the trials are formally completed. Our proactive role in collating consent holder reports will ensure that we maintain a close watch on these remaining deliberate release sites.
- 7.3 The seed audit programme is currently the main focus of the GM Inspectorate's work and with the recently expanded list of crops this work occupies a significant proportion of Inspectors' time. We are working towards further improving the efficiency of the audit process with the development of a new database that will also be accessible by companies participating in the audit. We will be contacting these companies to discuss issues of data compatibility in the near future.
- 7.4 Research scientists and statisticians will continue to develop expertise in sampling and detection of GMOs, and participation in a range of Defra-funded and European Commission-funded projects will further strengthen and consolidate CSL's skills base in this field. Current projects are listed in Annex 1 of this report. We will continue to provide assistance to Defra, and other government departments as requested, in the development of standards and guidance in connection with GM inspection and enforcement.

## 8. Further information and contact details

- 8.1 For further information on the GM Inspectorate or its activities please visit our website at: [http://www.csl.gov.uk/prodserv/cons/gm\\_insp/gm\\_insp.cfm](http://www.csl.gov.uk/prodserv/cons/gm_insp/gm_insp.cfm).

Or contact us at:  
GM Inspectorate  
Central Science Laboratory  
Sand Hutton  
York YO41 1LZ  
UK

Telephone: + 44 (0) 1904 462000  
Fax: + 44 (0) 1904 462741  
Email: [gm-inspectorate@csl.gov.uk](mailto:gm-inspectorate@csl.gov.uk)

- 8.2 For further information on the gemma (genetically modified material analysis) scheme please visit <http://ptg.csl.gov.uk/gemma.cfm>, or contact us at:

FAPAS, CSL  
Sand Hutton  
YORK YO41 1LZ  
UK

Telephone: +44 (0) 1904 462100  
Fax: +44 (0) 1904 462111 or +44 (0) 1904 462040  
Email: [fapas@csl.gov.uk](mailto:fapas@csl.gov.uk)  
For test material sales: [fapas.sales@csl.gov.uk](mailto:fapas.sales@csl.gov.uk)

- 8.3 For further information about the CSL independent GM testing service please visit <http://www.csl.gov.uk/prodserv/ana/foodauthentication/foodauthentication.cfm-gm>

Email: [foodanalysis@csl.gov.uk](mailto:foodanalysis@csl.gov.uk)

## Annex 1: GM-related research ongoing at CSL

In addition to the projects described in section 5 of this report, the following research projects are ongoing at CSL.

All CSL research is undertaken in a manner that is compliant with the Joint Code of Practice for Quality Assurance in Research issued by BBSRC, Defra, FSA and NERC.

Description	Funding body
<p><b>Quantitative approaches to the risk assessment of GM crops</b></p> <p>The key aims of the project are:</p> <ol style="list-style-type: none"> <li>1. To provide a literature review of current knowledge of approaches to quantitative risk assessment, including probabilistic methods and the meta-analysis of combined datasets, and evaluate their potential applicability to risk assessment of GM crops.</li> <li>2. To carry out case studies aimed at applying probabilistic risk assessment to existing data concerning GM crops, with a view to assessing the feasibility and usefulness of the approach.</li> </ol>	<p>Defra</p>
<p><b>Availability and use of general surveillance information for potential changes resulting from GM crop cultivation</b></p> <p>The key aims of the project are:</p> <ol style="list-style-type: none"> <li>1. To identify all the existing UK environmental monitoring schemes whose data could feed into the post-market monitoring programmes of GM crops.</li> <li>2. To assess the quality, quantity and frequency of the data generated in the schemes identified and suggest how data from them could be most effectively used in post-market monitoring programmes to identify unanticipated impacts associated with commercial GM crop releases.</li> <li>3. To design a database to collate and integrate monitoring results (from general surveillance and case-specific monitoring) supplied by companies who have released a GM crops(s) onto the European market.</li> </ol>	<p>Defra</p>

<p><b>A combined protocol for PCR detection of GMOs in seed</b></p> <p>The key aims of the project are:</p> <ol style="list-style-type: none"> <li>1. Development, optimisation and assessment of a combined PCR-based approach to seed testing which can provide both % GM seed and % GM DNA results in order to improve the reliability of borderline test decisions and provide results to inform decisions for seed and crop thresholds, which may be expressed differently in legislation.</li> <li>2. Provide accurate estimates of uncertainty associated with different thresholds and measured % GMO results.</li> </ol>	<p>Defra</p>
<p><b>Sustainable introduction of genetically modified crops into European agriculture (SIGMEA)<sup>13</sup></b></p> <p>The overall objective of SIGMEA is to:</p> <p>“Set up a science-based framework, strategies, methods and tools for assessing the ecological and economical impacts of GM crops and for an effective management of their development within European cropping systems, i.e. to create a practical toolbox.”</p>	<p>Specific targeted research project funded by the European Commission through the Sixth Framework Programme (Priority: policy oriented research)</p>
<p><b>GM and non-GM supply chains: their co-existence and traceability (Coextra)<sup>14</sup></b></p> <p>The main aims of the project are:</p> <ol style="list-style-type: none"> <li>1. Developing comprehensive tools and methodologies and integrate them along with existing ones into embedded decision-support systems aimed at enabling co-existence between GM and non GM (conventional and organic) crops.</li> <li>2. Tracing of genetically modified organism (GMO) materials and derived products, along the food and feed chains.</li> <li>3. Anticipating the future expansion of GMOs in both quantitative as well as qualitative terms.</li> </ol>	<p>Integrated Project funded by the European Commission through the Sixth Framework Programme under the Food Quality and Safety Priority.</p>
<p><b>Factors affecting cross-pollination in oilseed rape varieties, particularly of low fertility, growing under typical UK conditions</b></p> <p>CSL is a partner in this 4-year field-scale project that is using conventional varieties of oilseed rape to examine the factors that affect levels of cross-pollination between plants growing in adjacent fields and more distant fields under typical UK conditions. The project is examining the effects of percentage male fertility, geographic location, field orientation and size, the role of insects and influence of (same or different crop) barriers on cross-pollination. The output will provide guidance on management options to ensure crop purity is within accepted levels. The Scottish Crops Research Institute leads the project; partners include Rothamsted Research, the National Institute</p>	<p>Defra</p>

<sup>13</sup> <http://sigmea.dyndns.org>

<sup>14</sup> <http://www.coextra.org>

<p>of Agricultural Botany (NIAB), the Agricultural Development and Advisory Service (ADAS) and the Centre for Ecology and Hydrology (CEH Dorset). The project is due to complete at the end of 2006.</p>	
<p><b>UK surveillance exercise – the presence of GM soya in sausage</b>  The main aims of the project are:  Analysis of retail brand sausages collected by the Food Standards Agency.</p> <ol style="list-style-type: none"> <li>1. Detection of the presence of GM soya.</li> <li>2. Quantification of GM soya to be carried out at CSL according to validated in-house method for round up ready soya.</li> </ol>	<p>Food Standards Agency</p>