



Annual report on Activities Performed by the UK NRL for GMOs in Feed and Food

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for Genetically Modified
Organisms in feed and food

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Glossary

CRM - Certified Reference Material

DNA - Deoxyribonucleic acid

EFSA - European Food Safety Authority

ENGL - European Network of GMO Laboratories

EU-RL - EU Reference Laboratory for GMOs in feed and food

FSA - Food Standards Agency

FVO - European Commission Food and Veterinary Office

GeMMA - genetically modified materials analysis

GMO - Genetically Modified Organism

IRMM - Institute for Reference Materials and Measurements

NRL - National Reference Laboratory (nominated under Regulation (EC) 882/2004)

nrl - national reference laboratory (under Regulation (EC) 1829/2003)

OCL - Official Control Laboratory

PA - Public Analyst

PASS - Public Analyst Scientific Services

PCR - Polymerase Chain Reaction

PSP - Pre-Spotted Plate

SASA - Science and Advice for Scottish Agriculture



Role of the National Reference Laboratory

Commission Regulation (EC) 882/2004 was introduced to remove variation in the way European Community legislation is implemented in different Member States. This regulation relates to official controls designed to ensure the verification of compliance with feed and food law, animal health and animal welfare rules. The aim is to create an integrated and more comprehensive, risk-based, 'farm to fork' approach to official controls. The objective is to improve the consistency and effectiveness of controls across the EU and, as a consequence, raise standards of food safety and consumer protection.

The Regulation sets out the general approach that must be taken and the principles that must be adopted by the authorities in EU Member States with responsibility for monitoring and enforcing feed and food law. These include the competent authorities organising and undertaking official controls. The various central Government agencies and local authorities that are responsible for organising and undertaking official controls constitute the competent authorities and include (for food and feed) the Food Standards Agency, the Health and Safety Executive and the Department of Environment, Food and Rural Affairs (Defra).

Regulation (EC) No 882/2004 also specifies requirements for certain specialised laboratories to provide the science that underpins regulation:

- Official Control Laboratories (OCLs): Central competent authorities designate official laboratories for the purposes of chemical analysis or microbiological examination of feed or food samples taken by enforcement practitioners (in the UK they are Public Analysts (PAs) and Agricultural Analysts (AAs)).
- Reference Laboratories (RLs): In order to provide technical and scientific support for the official control framework, the European Commission has created a network of National Reference Laboratories (NRLs) co-ordinated by European Union Reference Laboratories (EU-RLs) formerly known as Community Reference Laboratories (CRLs).
 - EU-RLs are appointed by the European Commission. They provide the Commission with scientific and technical assistance. They are responsible for providing NRLs with details of analytical or diagnostic methods, including reference methods, and co-coordinating their application (in particular by organising comparative testing). They conduct training courses for NRL staff and keep them up to date in their field of expertise. They also coordinate practical arrangements needed to apply new analytical/diagnostic methods.
 - NRLs: Each Member State must designate an NRL to correspond to each EU-RL. NRLs must collaborate with the EU-RLs in their particular area of expertise and disseminate nationally information provided by the EU-RLs. They are responsible for co-coordinating the activities of OCLs and should, where appropriate, organise comparative tests between them. In addition, they provide scientific and technical assistance to the central competent authorities.

The functions of NRLs are specified in Article 33 of Regulation 882/2004 and require NRLs to:

- a) Collaborate with the European Union Reference Laboratory (EU-RL) in its area of competence.



- b) Coordinate, with regard to methods of sampling and analysis, for their area of competence, the activities of official laboratories responsible for the analysis of samples in accordance with Article 11 of 882/2004.
- c) Where appropriate, organise comparative tests between the official national laboratories and ensure an appropriate follow-up of such comparative testing.
- d) Ensure the dissemination to the competent authority and official national laboratories of information that the EU-RL supplies.
- e) Provide scientific and technical assistance to the competent authority for the implementation of coordinated control plans adopted in accordance with Article 53.
- f) Be responsible for carrying out other specific duties provided for in accordance with the procedure referred to in Article 62(3) [that deals with voting rules and working groups] , without prejudice to existing additional national duties.

NRL duties include advising the competent authority (FSA, Defra, Chemicals Regulation Directorate and Veterinary Medicines Directorate), and OCLs on sound measurement science and appropriate sampling methods.

LGC was re-appointed the UK National Reference Laboratory for genetically modified organisms (GMOs) in feed and food in March 2013, following its initial appointment in 2009. LGC's appointment by the Food Standards Agency on behalf of the European Commission is under Regulation (EC) 882/2004, which aims to remove variation in the monitoring and enforcement of feed and food law across the European Union. As the National Reference Laboratory for GMOs LGC is contracted to conduct the following activities, as specified in the contract with the FSA:

Core Function

Objective 01 – Secretariat Service (Core Function A)

Example Task:

- Disseminating information/advice supplied by the EU-RL and its working groups to the FSA, OCLs and other relevant laboratories.

Objective 02 – Advice and Representation within the UK/EU (Core Function B)

Example Tasks:

- Providing impartial expert advice as requested to the FSA, OCLs and other relevant laboratories on analytical methodology in the context of Official Controls.
- Representing the UK at relevant EU-RL meetings, and its working-groups.

Objective 03 – Production of Standard Operating Procedures, Codes of Practice and Guidance Documents (Core Function C)

Example Task:

- Contributing to the development of standardised operating procedures, relevant codes of practice and guidance documents for use by OCLs and other relevant laboratories, as requested by the FSA.

Objective 04 – Compliance Assessment via audits and ring trials (Core Function D)

Example Task:

- Participating in proficiency tests and method validation studies organised by the EU-RL, informing the FSA of the results and implementing any corrective measures required

Objective 05 – Co-ordination within the UK of EU-RL initiatives (Core Function E)

Example Task:

- Archiving of Standard materials (Control Materials) provided by the EU-RL

Objective 06 – Communication of results and data use (Core Function F)

Example Task:



- The Contractor shall ensure that the FSA receives regular updates of any developments related to the core functions of the NRL.

Additional Tasks

Objective 07 – Additional services and Tasks (as detailed in Annex I of the invitation to tender)

Example Tasks:

- If required, assist the EU-RL in testing and validating the methods of detection for GMOs, when necessary.
- Participate and contribute to the scientific input at meetings, e.g. the European Network of GMO Laboratories (ENGL) meetings, and working groups in a manner which supports UK policy on GMOs based on best available scientific knowledge.



Core Function

Production of the NRL annual report

This report details the activities carried out during the 6th year of the NRL operation (April 2014-March 2015) in relation to the duties of the NRL.

OBJECTIVE 01 - SECRETARIAT SERVICES - (CORE FUNCTION A)

Example Tasks:

- **Disseminating information/advice supplied by the EU-RL and its working groups to the FSA, OCLs and other relevant laboratories in a timely and effective manner.**
- **Creating and maintaining an efficient two-way channel of communication with OCLs and relevant laboratories and the EU-RL, including disseminating information on analytical methods and EU Regulations to OCLs and feedback of comments from OCLs to the EU-RL.**
- **Providing regular updates to the FSA on NRL activities, and up-to-date information on UK OCLs and other relevant laboratories to the FSA as requested.**

Example activities in relation to these Tasks:

- Advised the FSA with respect to the publication of the revised EU-RL Guidance on testing for Chinese GM rice, which was published on the EU-RL website (<http://gmo-crl.jrc.ec.europa.eu/riceemergchina.htm>). The new guidance incorporated additional revisions for clarity, direction on more prescriptive melting temperature (T_m) criteria for acceptance, and establishment of a relative “C_t” threshold for exclusion of false positives.
- Incorporated the changes from the revised EU-RL guidance into a training day for Public Analysts regarding an Interactive workshop for Chinese GM rice, held at LGC on 24th June 2014.
- Provided the FSA with an updated list of Official Control Laboratory (OCL) contact details for assistance with the circulation of a questionnaire in preparation for a visit from the European Commission Food and Veterinary Office (FVO) to the UK.
- Provided the FSA with E-mail traceability regarding a request which was sent round to OCLs regarding comments on the draft “Low Level Presence” (LLP) regulation (now published as Regulation (EC) No 619/2011), which was circulated in 2010.
- Provided comments to the FSA in relation to suggestions for points on the agenda to raise at the 27th ENGL Steering Committee meeting held in 2014.
- Communicated to the FSA that it had been announced that the USDA had approved the “Enlist” GM maize and soybean seed varieties for commercial cultivation without special authorisation. This included stacked events for herbicide resistance for 2, 4-dichlorophenoxyacetic acid (2, 4-D) and Glyphosate (Roundup®).
- Provided comments on topics for discussion at the 28th ENGL Steering Committee meeting in response to an E-mail request sent by the FSA.
- Provided the FSA with technical input on synthetic biology for an FSA report.
- Provided the FSA with views and advice on training requirements for Regulation (EC) No 619/2011 in response to an E-mail request.
- Circulated an E-mail request from the FSA regarding information on botanical impurities to UK OCLs.



OBJECTIVE 02 - ADVICE AND REPRESENTATION WITHIN THE UK/EU - (CORE FUNCTION B)

Example Tasks:

- Providing impartial expert advice as requested to the FSA, OCLs and other relevant laboratories on analytical methodology in the context of Official Controls.
- Representing the UK at relevant EU-RL meetings, and its working-groups, consulting the FSA on objectives and requirements before each meeting and providing the FSA with an internal report of the meeting within two weeks of each meeting.
- Participating in activities organised by the EU-RL and contributing to the scientific input at EU-RL meetings and in manner which supports UK policy based on best available scientific knowledge.
- Advising the FSA, OCLs and other relevant laboratories on best scientific practice in testing for Official Controls and undertaking activities in consultation with the FSA that facilitate and promote their application in the UK within the policy aims of the FSA.
- Keeping abreast of and advising the FSA, OCLs and other relevant laboratories of developments for the sampling, testing and detection of analytes.

Example activities in relation to these Tasks:

Advice provided to Official Control Laboratories:

- Advice provided to OCLs in relation to best measurement practices for DNA extraction, detection of minority targets, and PCR Quality Metrics.
- Advised OCLs where to purchase GM T25 maize reference material. The Institute for Reference Materials and Measurements (IRMM) in Belgium do not officially supply this, but AOCS (American Oil Chemists Society) are authorised suppliers.
- Provided appropriate FSA contact details to OCLs following an enquiry regarding interpretation of GMO legislation.
- Discussed and exchanged information with OCLs in relation to a SYBR@Green approach and melt-curve analysis as part of a GM screening approach that was being ring-trialled through the GMOval project (an EU project financially supported by the FSA and aimed at developing effective screening strategies for detection of GMOs).
- Provided advice to OCLs with respect to use of primers in the SYBR@Green assay for detection of GMOs.
- Discussed availability and access to the pre-spotted plates for GM screening with the EU-RL, following a request from OCLs. Arranged access to these plates by the OCLs.

Miscellaneous advice and representation:

- Arranged for a Material Transfer Agreement to be set up between the EU-RL and OCLs to allow access to the EU-RL Pre-Spotted Plates (PSPs).
- Provided guidance to an OCL in relation to environmental monitoring for ISO 17025 purposes following a request for help and advice as a direct result of the FVO audit.
- Provided advice to the FSA regarding trueness associated with digital PCR that was reported at the ENGL Steering Committee (SC) meeting.
- Advised the FSA on methods for detection of soya in wheat flour as part of a consultation process prior to an FSA formal survey in the UK. Provided advice on methods, LODs and sampling issues.



- Advised the FSA on strategies to detect P-35S/T-NOS in the wheat flour formal sampling survey that had been conducted by the FSA.
- Attended the EU-RL digital PCR workshop held at the JRC on 19th November 2014.
- Submitted a position statement on digital PCR which was discussed at the EU-RL digital PCR experts meeting on 26th November 2014.
- Attended and participated in the GMOval Open Meeting at the FSA, Aviation House, London.



OBJECTIVE 03 - PRODUCTION OF STANDARD OPERATING PROCEDURES, CODES OF PRACTICE AND GUIDANCE DOCUMENTS - (CORE FUNCTION C)

Example Tasks:

- **Contributing to the development of standardised operating procedures, relevant codes of practice and guidance documents for use by OCLs and other relevant laboratories, as requested by the FSA.**

Example activities in relation to these Tasks:

- Provided advice to the FSA in relation to a new draft document on Definition of Minimum Performance Requirements for Analytical Methods of GMO Testing. Advised the FSA that the NRL's view was to keep the original acceptance criteria for fitness for purpose of a method with the PCR efficiency of 90 to 110%, and not to adopt the proposal for accepting a change for 75% to 110% as there was no scientific rationale for the change.
- The NRL is a named partner on the reviewed version of the ENGL Guidance Document on the estimation of measurement uncertainty in GMO analysis.



OBJECTIVE 04: COMPLIANCE ASSESSMENT VIA AUDITS AND RING TRIALS - (CORE FUNCTION D)

Example Tasks:

- **Ensuring consistency and quality of testing approaches applied by UK OCLs and other relevant laboratories, including advising on corrective action following adverse reports on OCLs from UKAS**
- **Participating in proficiency tests and method validation studies organised by the EU-RL, informing the FSA of the results and implementing any corrective measures required**
- **Co-ordinating training exercises to promote best laboratory practice in respect of analysis.**

Example activities in relation to these Tasks:

- LGC hosted and led an interactive workshop on approaches for detecting Chinese genetically modified rice for Public Analysts on 24th June, the day after revised guidance on GM rice analysis was issued by the European Commission:
 - The workshop was supported by the Food Standards Agency (FSA) and the UK National Measurement Office as part of the Government Chemist Programme 2014-2017, and was aimed at raising awareness of approaches used for detection of Chinese GM rice varieties.
 - Representatives from six Public Analyst laboratories, as well as from Defra and the FSA attended the workshop.
 - The day featured a review of the European Union Reference Laboratory guidance for the analysis of rice and rice products for GM events, with an overview of the recently revised parts of the guidance.
 - Each Public Analyst laboratory provided a short presentation emphasising its experiences with GMO analysis and highlighted issues that they faced, which were debated as part of round table discussions.
 - The Keynote speech was provided by Dr Nancy Roosens from the Scientific Institute of Public Health in Belgium. Dr Roosens spoke about the initial development of the SYBR® Green method for screening for Chinese GM rice and how this was incorporated into the European Union Reference Laboratory guidance.
 - During the afternoon session delegates analysed example data sets, and discussed and agreed issues on the interpretation of results.
 - In order to facilitate a standardised approach to screening for Chinese GM rice varieties, LGC provided a set of PCR positive controls to all Public Analysts laboratories involved in GMO analysis, which should be used as Quality Control (QC) materials. The PCR positive controls represented a set of in-house materials of known composition for use in the detection of the P-35S, T-NOS and CryIAb/Ac genetic motifs in support of the EU-RL guidance for detection of Chinese GM rice.
 - Each PCR positive control material was comprised of DNA that has been extracted from relevant Certified Reference Materials (CRMs), then quantified and diluted to an appropriate working concentration.
 - The working concentrations have been tested and chosen in order that, when used with the SYBR®Green real-time method described in the EU-RL Guidance document, they generated a reliable positive signal with each of the respective assays in compliance with the EU-RL published guidance.



- The NRL participated in the 8th EU-RL Comparative Test (ILC_EURL_GMFF_CT_02_13) organised by the EU-RL under Regulation (EC) No. 882/2004.
 - According to the EU-RL-GMFF it is mandatory that all NRLs (nominated under Commission Regulation (EC) No. 882/2004 of the European Parliament of the Council of 29th April 2004 on official controls performed to ensure the verification of compliance with feed and food law, animal health and animal welfare rules), participate in these Comparative Tests.
 - This Comparative Test involved analysing two test materials of rice noodles for the presence of GMOs. Participants were asked to screen the two test materials for the presence of any maize, soybean, oilseed rape and rice species. Of those species detected, participants were asked to identify and quantify any GMO events present. Comparative test results were published in August 2014.
 - The NRL received one questionable Z-score ($[2] < Z < [3]$) out of six associated with the 7th EU-RL Comparative Test (ILC_EURL_GMFF_CT_01_13) in relation to maize event Mon863. The FSA were immediately informed of this result. For this Comparative Test round, around 20% of laboratories were awarded a Z-score greater than 2.
 - According to internal quality procedures, the NRL took corrective action to investigate the cause of the issue further. Examination of the distribution of data submitted by all laboratories indicated that the results did not appear to conform to a normal distribution and exhibited characteristics of a bimodal model.
 - Following in-depth analysis of participant's data sets by the NRL, there was evidence that two analytical methods were used: approximately half of the results submitted used a maize reference gene (hmg) not referred to in the EU-RL validated protocol and the other half used the maize reference gene correctly referred to in the EU-RL validated protocol (adh1).
 - Experimental evidence and publications by leading experts in the field (including IRMM) suggest that adh1 can give very variable results even though it is still referred to in the official EU-RL validated protocol, because of a Single Nucleotide Polymorphism (SNP) in the primer sequence.
 - Having consulted the literature and sought statistical advice, the NRL therefore felt there was sufficient justification to appeal against the awarded Z-score and ask the EU-RL for further comment and to review the data accordingly.
 - This appeal was upheld by the EU-RL who agreed the NRL's comments were valid. The EU-RL recalled and revised the final report accordingly.
 - The EU-RL published a statement recognising that the results may come from two distributions (arising from those laboratories that use the hmg and adh1 reference genes) and therefore the application of Z-scores as detailed in the report were inappropriate.
 - The EU-RL later published a statement on their website advising that the use of the adh1 reference gene, as advised in their validated protocols, was now considered inappropriate for quantitative purposes.
- The NRL participated in and submitted results for NRL Comparative Test #09 (ILC_EURL_GMFF_CT_01_14) and received Z-scores of -0.62; -0.11; -0.13; -0.68 and -0.62.
- The NRL participated in and submitted results for NRL Comparative Test #10 (ILC_EURL_GMFF_CT_02_14). Results are currently being analysed.



OBJECTIVE 05 - CO-ORDINATION WITHIN THE UK OF EU-RL INITIATIVES - (CORE FUNCTION E)

Example Tasks:

- **Archiving of Standard materials (Control Materials) provided by the EU-RL**

Example activities in relation to these Tasks:

- Took receipt of additional EU-RL control materials for Maize 5307 and soybean DAS-68416-4
- The full list of materials archived at the NRL as of 31/03/15 is shown in Annex I
- The physical and electronic register for control materials was updated and revised accordingly in line with ISO 17025 and internal working procedures.



OBJECTIVE 06 - COMMUNICATION OF RESULTS AND DATA USE - (CORE FUNCTION F)

Example Tasks:

- **The Contractor shall ensure that the FSA receives regular updates of any developments related to the core functions of the NRL.**

Example activities in relation to these Tasks:

- Held a teleconference with the FSA in relation to the issues and agenda points discussed at the 21st ENGL plenary meeting held in June 2014.
- Attended an NRL liaison meeting with the FSA in August 2014 in order to formally present activities it had participated in six months through the current financial year.
- Hosted an NRL liaison meeting at LGC with the FSA in March 2015 in order to formally present activities that the NRL had participated in throughout the entirety of the current financial year.
- Provided summaries and full report details to the FSA in relation to all EU-RL and ENGL plenary meetings.



ADDITIONAL TASKS

OBJECTIVE 07:- ADDITIONAL SERVICES AND TASKS (as detailed in Annex I of the invitation to tender)

Example Tasks:

- **If required, assist the EU-RL in testing and validating the methods of detection for GMOs, when necessary.**
- **Participate and contribute to the scientific input at meetings, e.g. the European Network of GMO Laboratories (ENGL) meetings, and working groups in a manner which supports UK policy on GMOs based on best available scientific knowledge.**

Example activities in relation to these Tasks:

- Attended the 21st ENGL Plenary session on the 4th - 5th June 2014 held in Barza d'Ispra (Italy). Important topics discussed included the detection of Chinese GM rice Bt63 in feed samples; laboratory participation in the EU-RL Comparative Tests; the validation of the EU-RL pre-spotted plates project for screening of GMO varieties; the validation of detection approaches as part of the EU GMOval project; approaches that had been used for the detection of GM papaya; and the expansion of ENGL expertise into additional areas including DNA extraction, digital PCR, animal and plant speciation, and allergen detection.
 - A summary report of the 21st ENGL plenary session was provided to the FSA and also distributed to UK Official Control Laboratories.
 - A detailed meeting report of the 21st ENGL plenary session was provided to the FSA.
- The NRL participated in an inter-laboratory validation exercise for the second generation of EU-RL pre-spotted plates:
 - These plates consist of lyophilised primers and probes on standard 96 well microtitre plates. The pre-spotted plates facilitate the simultaneous detection of 44 single-insert GMOs. These plates include 7 taxon-specific, 5 element-specific, 1 construct-specific and 3 event-specific methods that will detect all but one authorized GM event (cotton GHB614) listed in the EU Register as of November 2013 in one single real-time PCR experiment. The system facilitates the detection of 44 authorized GM events from maize, soybean, oilseed rape and cotton.
 - It is the NRL's view that these plates are very useful in terms of a cost-effective and practical solution for the screening of GMOs, particularly for those laboratories that do not participate in routine analysis.
- The EU-RL periodically invites ENGL members (EC Regulation No. 1829/2003) to participate in the validation of new methods for GMO (event specific) detection, as part of the EU authorisation procedure for new GMO varieties. The NRL participated in the EU-RL validation exercise to assess the fitness for purpose of a method for the detection and quantitation of soya bean event DAS_81419_2.
- Extensive preparation to host part of the EU Food and Veterinary Office (FVO) audit to the UK at LGC including production of presentations encompassing the following activities:
 - NRL Yearly reports
 - Chinese GM rice workshop held at LGC in 2014
 - Presentation on all NRL activities since 2009



- Presentations to address FVO audit specific questions on Chinese GM rice and implementation of (EC) Regulation No. 619/2011
- NRL input into EU-RL and ENGL Working Groups and Guidance Documents.
- Presentations on all PT test results (Eight NRL Comparative Tests and 28 GeMMA rounds)
- ISO 17025 accreditation (Flexible scope)
- Training courses (DNA extraction and PCR) and bespoke guidance/training to OCLs on real-time PCR
- Continuous representation at all ENGL plenary meetings (and NRL meetings)
- Summary of participation in all EU-RL led validation exercises.
- Hosted the FVO audit at LGC on 15th September 2014 (FSA and Worcester OCL also in attendance) to ensure UK compliance with relevant EU legislation on GMO regulation. Involved:
 - Presentations
 - Lab tour audit
 - Sample analysis audit
 - Audit of Storage of materials
 - Accreditation compliance
 - Inspection of Quality Systems including SOPs, Working Instructions, etc.
- FVO final audit report (DG(SANCO) 2014-7209 - MR FINAL):
 - “The methods adopted and evaluation of results [by the NRL] were in line with the EU legislation”
 - “The NRL is adequately staffed and equipped to perform GMO analysis; procedures are in place to monitor the competence of official control laboratories. It provides technical and scientific support to CCA, public analysts and laboratories
 - The NRL meets the requirements of Article 33 of Regulation (EC) No 882/2004 and the relevant international standards.”
- Provided advice and support to the FSA in relation to preparing responses to questions raised during the FVO audit.
- Attended the 10th NRL and 22nd ENGL Plenary meetings, held at Ispra, Italy:
 - Provided an E-mail summary to the FSA regarding important points discussed at the ENGL Plenary meeting.
 - Held a one hour teleconference with the FSA regarding the points discussed at the ENGL Plenary meeting.
 - Provided a summary document and detailed meeting report for ENGL 22nd Plenary meeting sent to FSA.
 - Provided a summary document on the ENGL 22nd Plenary meeting to all OCLs.



Annex 1: List of ENGL Control materials housed by the NRL

GM event	Species	ENGL plasmid no.
Ms8	Canola	pENGL-00-06/04-01
Rf3	Canola	pENGL-00-07/04-01
T45	Canola	pENGL-00-14/04-01
RT73	Canola	pENGL-00-26/04-01
LL25	Cotton	pENGL-00-13/04-01
281-24-236	Cotton	pENGL-00-14/05-01
MON863	Maize	pENGL-00-01/04-01
TC1507	Maize	pENGL-00-02/04-01
59122	Maize	pENGL-00-03/05-01
MIR604	Maize	pENGL-00-04/05-01
T25	Maize	pENGL-00-08/04-01
Bt11	Maize	pENGL-00-12/05-01
NK603	Maize	pENGL-00-27/04-01
GA21	Maize	pENGL-00-29/04-01
EH92-527-1	Potato	pENGL-00-09/05-01
H7-1	Sugar beet	pENGL-00-28/04-01
40-3-2	Soybean	pENGL-00-08/05-01
MON1445	Cotton	pENGL-00-15/04-01
MON15985	Cotton	pENGL-00-24/04-01
MON531	Cotton	pENGL-00-16/04-01
3272	Maize	pENGL-00-03/06-01
Bt11	Maize	pENGL-00-10/07-01
LY038	Maize	pENGL-00-01/06-01
MON88017	Maize	pENGL-00-16/05-01
MON89034	Maize	pENGL-00-06/06-01
A2704-12	Soybean	pENGL-00-13/05-01
MON89788	Soybean	pENGL-00-05/06-01
GHB614	Cotton	pENGL-00-14/07-01
MON88913	Cotton	pENGL-00-05/07-01
GA21	Maize	pENGL-00-15/05-01
MON810	Maize	pENGL-00-25/04-01
A5547-127	Soybean	pENGL-00-01/08-01
DP-305423-1	Soybean	pENGL-00-07/07-01
DP-356043-5	Soybean	pENGL-00-04/07-01
T25	Maize	pENGL-00-08/04-01
GHB119	Cotton	pENGL-00-04/11-01
MIR162	Maize	pENGL-00-08/08-01



CV127	Soybean	pENGL-00-01/09-01
MON87705	Soybean	pENGL-00-01/10-01
MON87460	Soybean	pENGL-00-04/09-01
FG72	Soybean	pENGL-00-04/10-01
MON87701	Soybean	pENGL-00-05/09-01
MON87769	Soybean	pENGL-00-07/09-01
T304-40	Cotton	pENGL-00-05/11-01
DAS-40278	Maize	pENGL-00-10/10-01
BT176	Maize	pENGL-00-18/04-01
Rf1	Oilseed rape	pENGL-00-09/04-01
Rf2	Oilseed rape	pENGL-00-10/04-01
Ms1	Oilseed rape	pENGL-00-11/04-01
Topas 19/2	Oilseed rape	pENGL-00-12/04-01
MON87708	Soybean	pENGL-00-02/11-01
3006-210-23	Cotton	pENGL-00-14/05-01-B
DP73496	Oilseed rape	pENGL-00-02/12-01
MON88302	Oilseed rape	pENGL-00-09/11-01
5307	Maize	pENGL-00-07/11-01
DAS-68416-4	Soybean	pENGL-00-11/10-01