Ministry of Infrastructure
and the Environment

> RIVM/SEC/BGGO, PO box 1, 3720 BA Bilthoven, The Netherlands.

Contact

Our ref.
C/NL/04/02_001.ar.1

Your ref

Cc

Encl.

ASSESSMENT REPORT OF THE NETHERLANDS COMPETENT AUTHORITY IN ACCORDANCE WITH DIRECTIVE 2001/18/EC

RENEWAL OF NOTIFICATION C/NL/04/02

1. THE NOTIFICATION

The notification, submitted by Suntory Flowers Limited, Tokyo, Japan (formerly: Florigene), concerns renewal of placing on the market of imported cut flowers derived from genetically modified carnation (*Dianthus caryophyllus*) line 123.2.38 (FLO-40644-6) in accordance with Directive 2001/18/EC. The flowers of the carnation line have been modified with the *dfr* and *f3'5'h* gene from petunia (*Petunia x hybrida*), resulting in a modified flower colour (dark purple). Line 123.2.38 also contains a herbicide tolerance gene (s*uRB*) from *Nicotiana tabacum*, used to facilitate selection *in vitro*. The commercial name of the product is Florigene®Moonlite™.

2. SCOPE OF THE NOTIFICATION

This notification for renewal concerns import, distribution and retailing of line 123.2.38 in the cut flower market in the same way as any other carnation. This notification does not include cultivation or the use as feed or as food of line 123.2.38.

3. PROCEDURE

The original decision of the Netherlands competent authority to Florigene for import of line 123.2.38, under dossier number C/NL/04/02, was issued on July 11, 2007. According to article 17 of Directive 2001/18/EC the notifier shall submit a notification to the competent authority which received the original notification at the latest nine months before the expiry of the consent.
The dossier for renewal was received by the Netherlands competent authority on May 25, 2016. This dossier, under number C/NL/04/02_001, has been assessed with reference to Article 17 (2) of Directive 2001/18.

Scientific advice

Based on the dossier for renewal of May 25, 2016, the Dutch scientific advisory committee (COGEM) gave its advice on July 6, 2016 (CGM/160706-03) and concluded that the risks for human health and the European environment associated with import, distribution and retail of cut flowers of line 123.2.38 are negligible.

Confidentiality
The notification does not contain any information which the applicant regards as Confidential Business Information.

4. LIST OF DOCUMENTS

Based on article 17 (2) of Directive 2001/18/EC the following is required for a renewal of an existing market approval:

a) A copy of the consent to the placing on the market of the GMO
b) A report of the results from monitoring
c) Any new information which has become available with regards to the risks of the product to human health and/or the environment
d) As appropriate, a proposal for amending or complementing the conditions of the original consent, inter alia the conditions concerning future monitoring.

(a) A copy of the consent to the placing on the market of the GMO
A copy of the consent, issued by the Netherlands on July 11, 2007, is provided in *appendix 1* of the application for renewal.

(b) A report of the results from monitoring
Reports of monitoring during 8 years are supplied (2008-2015) in *supplementary file 1*. The reports contain:

- Questionnaire feedback from the importer
- Feedback from an expert group
- Feedback though mail
- Literature review
- Database review
- Website

The results from monitoring do not indicate any risk for human health and the environment of the import of cut flowers of line 123.2.38.

(c) Any new information which has become available with regards to the risks of the product to human health and/or the environment
The following is supplied in the dossier for renewal:

- Annual monitoring (*2.2*) and surveys at the production site (*3.2*)
- Monitoring of the scientific literature (*2.2* and *3.5*)
- Up to date bioinformatics analyses (*Appendix 2*)
- Stability and morphological changes (*3.3* and *3.4*)
- Literature review of potential allergenicity and safety of delphinidin (*3.5*)

A summary of all new information that generated or found since the consent was issued in 2007, is described below.

Annual monitoring (*2.2*)
Reports of monitoring during 8 years are supplied (2008-2015) in *supplementary file 1*. The reports contain:

✓ <u>Questionnaire feedback from the importer</u>
These questionnaires have been provided by the importer each year. The importer has reported every year that they were not aware of any illegal growing and that neither their staff nor consumers have reported any adverse effects of handling the flowers.

✓ <u>Expert monitoring group</u>
Since 2008 an expert group of breeders and research experts has been established. Each year members of the group have been asked to report on whether they have become aware of any illegal propagation of transgenic

carnation in Europe, or of the incidence of any wild carnation populations. There was no evidence of the establishment of transgenic carnation in the wild, or of introgression to wild *Dianthus* species in any survey, in any year. The survey work was largely confined to the Netherlands, Greece and the Swiss Alps. No reports of illegal propagation were made.

- ✓ Mailing list

With the exception of the year 2009 herbaria, European botanical and plant conservation groups, national plant protection authorities, Italian phytosanitary agencies, national botanic survey networks, plant protection services, botanical gardens and individual scientists have been contacted by mail and email to request information on any reports of the identification of wild populations of carnation. From 2008 to 2015 1,184 contacts were made. Some responses identified recent wild populations of *Dianthus caryophyllus*. In all cases where it was possible to confirm the nature of the samples, thse samples consisted of the 5- petal unimproved *Dianthus caryophyllus*, and not carnation.

- ✓ Literature review

From 2010 a literature search was undertaken on an annual basis to identify any new, or previously unidentified, scientific reports on any aspects of *Dianthus* biology or distribution in Europe. Since 2010, 226 reports were identified and summarised in monitoring reports. None of these reports identified carnation in the wild nor evidence of introgression of carnation to wild *Dianthus* species.

- ✓ Database review

From 2011, annual database and website review was added to the general monitoring process. 149 sites have been examined (most on an annual basis), all of which are actively maintained European based floras, vegetation checklists and on-line herbaria. Sites are in multiple languages. None of these reports identified carnation populations in the wild, though useful information was gained on the location and form of wild *Dianthus caryophyllus* populations largely in France. In all cases where it was possible to confirm the nature of the records, these collections were of the 5- petal unimproved *Dianthus caryophyllus*, and not carnation.

- ✓ Website

The Florigene website has been in place continuously since 2007 (http://www.florigene.com). No information on possible wild populations of Florigene®Moonlite™ has been sent to the website during the period from the public, distributors or retailers.

Surveys at the production site (*3.2*)
The two main sites of production, Colombia and Ecuador respectively, have been inspected regularly from 2008 to 2016. Composting areas were considered the most likely places in which a wild population might establish. On none of the inspections a wild population of carnation has been identified.

Monitoring of the scientific literature (*2.2*) and (*3.5*)
Since the EU consent for import is issued, three literature reviews have been carried out for other transgenic carnation lines with a similar phenotype. On May 3 and 4, 2016 a last citation and academic literature database search was carried out to determine whether there were any new scientific research reports identified. All publications are given in *Appendix 3* and *Supplementary file 7*. This latter file also contains publications with direct relevance to line 123.2.38 and literature reviews that were part of the monitoring plans (see 'literature review').

None of the reports identified since the approval was issued in 2007 suggests that line 123.2.38 poses a risk to human health and the environment.

Bioinformatics analyses (*Appendix 2*)
Up to date bioinformatics analyses using the sequence information from the original application were performed.

✓ Disruption of endogenous genes

The three expression cassettes are located on two loci in the genome of line 123.2.38. Blastn and tblastx analysis of a carnation genome database indicates that the insertion sites of the two insertion loci in line 123.2.38 are within non-coding regions of scaffold sequences of the carnation genome.

✓ Novel ORFS in junction regions

Two new open reading frames (ORFs) were created at the junction regions of locus 1. Blastp and FARRP allergen database searches indicate that the two ORF sequences identified do not have homology to known toxins or allergens.

✓ Inserted genes

Blastp and FARRP allergen database searches indicate that the inserted genes do not code for proteins with homology to known toxins or allergens.

Stability and morphological changes (*3.3)* and *(3.4*)

✓ Stability

Line 123.2.38 has been phenotypically stable since the approval for import in the EU. A consistently low percentage (circa 0.2%) of 'off types' is observed at the production sites. These off types produce pink instead of violet flowers.

✓ Morphology

From 2012 to 2016 style length, petal number and anther number was measured in flowers grown in Colombia and were demonstrated to be stable.

In addition, a comparative trial was performed in Colombia in 2015. Several significant differences were observed, but did not indicate an environmental risk according to the applicant, since the characters were either biologically irrelevant for gene flow or the characters may be related to gene flow but were lower in FLO-40644-6.

Literature review of potential allergenicity and safety of delphinidin (*3.5*)
See 'Monitoring of the scientific literature'.

None of these results indicates any risk for human health and the environment of a renewal of import of cut flowers of line 123.2.38.

(d) As appropriate, a proposal for amending or complementing the conditions of the original consent, inter alia the conditions concerning future monitoring

The following is supplied:

- Changes to the conditions of the original consent:
  - ✓ Unique identifier

    Upon request of Suntory, the unique identifier was changed from FLO-40644-4 to FLO-40644-6, thereby correcting an error in the calculation of the unique identifier.

  - ✓ Change of company name

    The consent for placing on the market for Moonlite™ was issued to Florigene Limited, Melbourne. This company has been purchased by Suntory Limited, Osaka, Japan. The company requests therefore that the consent for renewal will be in the name of Suntory Flowers Limited.

- Future monitoring
  - ✓ No changes are foreseen in the general monitoring scheme.
  - ✓ The detection method validated by JRC is still applicable.

Date
11 augustus 2016

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5. ADVICE OF THE NETHERLANDS COMPETENT AUTHORITY FOR DIRECTIVE 2001/18/EC

Based on the notification for renewal and the above mentioned considerations, the Netherlands competent authority concludes that no reasons have emerged on the basis of which consent to the proposed renewal of placing on the market should be withheld.

The Netherlands Competent Authority therefore proposes to consent to the renewal of placing on the market of the product as described below, for which a notification has been submitted on May 25, 2016, registered under number C/NL/04/02_001 under explicit specification of:

a) The consent will be granted to Suntory Flowers Ltd, Tokyo, Japan and concerns renewal of the placing on the market under part C of 2001/18/EC of the product consisting of carnation genetically modified with the *dfr, f3'5'h* and *SuRB* genes, with the unique identification code FLO-40644-6, for the purpose of import, distribution and retailing. The consent includes line 123.2.38, product name Florigene® Moonlite™. This consent excludes cultivation and excludes the use as feed or as food of line 123.2.38.
b) The consent will be valid for a period of 10 years after approval.
c) The company should ensure that the following information is transmitted in writing to the importer receiving the product:
   - The statement that "These flowers are genetically modified to alter the flower colour and are only produced for use as an ornamental product";
   - The unique identifier of line 123.2.38 is FLO-40644-6.
d) The consent holder is required to supply reference material of line 123.2.38 for detection purposes at any time to the competent authority.
e) The consent holder should carry out monitoring according to the general surveillance plan of the notification and report on the results of the general surveillance every year, during the period the consent is valid.
f) The consent holder shall submit to the Commission and to the competent authorities of the Member States annual reports on the results of the monitoring activities.

08 augustus 2016,

DE STAATSSECRETARIS VAN INFRASTRUCTUUR EN MILIEU,

namens deze,

het afdelingshoofd Veiligheid en Risico's

dr. Dick Jung

Date
11 augustus 2016

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