



## APPLICATION SUMMARY

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<b>Application code:</b>	GMF06001
<b>Application category:</b>	Field Test in Containment any Genetically Modified Organism under the Hazardous Substances and New Organisms (HSNO) Act 1996.
<b>Applicant:</b>	New Zealand Institute for Crop & Food Research Limited Canterbury Agriculture & Science Centre Private Bag 4704 Christchurch Mail Centre Christchurch 8140
<b>Applicant contact:</b>	Mary Christey
<b>Purpose:</b>	To assess agronomic performance, in the Lincoln region, over 10 years of vegetable and forage brassicas, specifically cabbage, broccoli, cauliflower and kale, modified for resistance to caterpillar pests like cabbage white butterfly and diamond-back moth
<b>Date application received:</b>	30 October 2006
<b>ERMA New Zealand contact:</b>	Jenny Khoo

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### Application Summary prepared by New Zealand Institute for Crop & Food Research Limited

Vegetables brassicas are widely grown in NZ for both the domestic and export market. Insect pests are a large problem on these crops with control requiring the use of 2.81 kg of active ingredient of insecticide per hectare. The most serious caterpillar pests are cabbage white butterfly and diamond back moth (DBM). While there are numerous chemical control methods available for these pests, there are problems particularly in DBM with the development of resistance to these chemicals. In addition there are concerns about the presence of chemical residues in the environment. As a result there is growing interest in the development of alternative control methods. The soil bacterium *Bacillus thuringiensis* (*Bt*) has been used for biological control of insects for over 30 years. In NZ commercial products containing this bacterium are available. As there are no *Brassica* cultivars or close relatives with caterpillar resistance the introduction of insecticidal genes from *Bt* into plants offers an alternative method for caterpillar control. In 2005 maize and cotton crops containing *Bt* genes were grown commercially on over 26M ha world wide, approximately three times the land area of NZ. Food products from these crops have been approved for human consumption in several countries including NZ.

We have used *Agrobacterium tumefaciens*-mediated transformation to produce broccoli, kale, cabbage and cauliflower transgenic for a *Bt* gene and demonstrated excellent control of DBM, soybean looper and cabbage white butterfly larvae in laboratory and greenhouse assays. *Bt*-containing plants cause mortality of freshly hatched larvae within 48h with no visible damage to the plant. However, field-testing of these plants is required to confirm the extent of insect control under agronomic situations and to assess any unexpected environmental effects of these plants. We expect that the *Bt*-containing plants will require fewer insecticide applications compared with non-*Bt* containing plants. In addition, we expect no detrimental effects on non-target organisms.

This field test does not involve DNA from human genes or native and valued introduced flora and fauna. The sequence of the DNA to be used was originally derived from the bacterium *Bacillus thuringiensis* but the sequence has been modified to allow optimal expression in plant cells. This DNA was manufactured in a DNA synthesiser. The plant material to be used, vegetable and forage Brassicas, all belong to the Brassicaceae or Crucifer family. They are not native to NZ and are not closely related to other native members of this family occurring in a different taxonomic tribe. Therefore inter-crossing is not possible.

These plants will be grown in a secure contained field location near Lincoln. The field test will be small, occupying an area of up to 0.4 ha and is it expected that each plant will be in the ground for up to 5 months. The plants will be transplanted into the field as small seedlings or plantlets and their growth and development monitored until the formation of marketable heads. The plants will then be removed from the field and either destroyed by autoclaving or replanted in a contained PC2 greenhouse for flowering and seed collection. The field test site will be subjected to the normal agronomic practises associated with growing vegetable brassicas including control of insects, weeds and diseases by chemical application as required. The field test will be monitored carefully every 3-4 days to ensure that no caterpillars are surviving on transgenic plants and that no open flower buds are visible on the plants. Plants will be removed when they initiate bolting and therefore well before flowers open to ensure no dispersal of genetically modified pollen. The field test site will be monitored monthly for volunteer plants for one year after the completion of the trial. The personnel associated with this field test are experienced with conducting field tests of genetically modified plants and are trained in the procedures associated with such field tests.

## **SUBMISSION ON APPLICATION GMF06001 to**

**Field test in containment genetically modified brassicas for resistance to caterpillar pests.**

### **Submission to:**

ERMA  
P O Box 131  
Wellington

### **Submission from:**

Waitakere City Council  
Private Bag 93 109  
Henderson  
Waitakere City

### **Contact person:**

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### **Submission and reasons**

Waitakere City Council is opposed to the application GMF06001 to field test genetically modified brassicas for resistance to caterpillar pests for the following reasons:

1. Release (use in the field) of genetically modified organisms, even in containment, potentially damages New Zealand's ability to export GM-free produce and products. Waitakere City Council strongly supports its local organic businesses, some of which have developed export markets for their organic and GM-free products.
2. Waitakere City Council urges ERMA to apply the precautionary principle in processing this application and assess the risks, including:
  - a. The risk that additional genetic material may also have been inadvertently transferred to the plants but expression of that material may be masked at present.
  - b. The risk that soil bacteria in the field trial plots could incorporate genetic material from the brassica plants and could similarly transfer the material to other plants. The subsequent transfer of caterpillar resistance may or may not be a desirable outcome if the caterpillars were lepidopteran larva of desirable species (native butterflies or Monarch butterflies).

### **Decision sought**

Waitakere City Council seeks the application to be declined.

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