

Application to

# Release a new organism by rapid assessment

That is not a genetically modified organism

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ENVIRONMENTAL RISK MANAGEMENT AUTHORITY



NGĀ KAIWHAKATŪPATO WHAKARARU TAIAO

Publication number 125/01

## Please note

This application form covers the release of a new organism by rapid assessment that is **not a genetically modified organism** under s35 of the Hazardous Substances and New Organisms (HSNO) Act.

This is the approved form for the purposes of s34 of the HSNO Act and replaces all previous versions.

Any extra material that does not fit in the application form must be clearly labeled, cross-referenced and included as appendices to the application form.

Confidential information must be collated in a separate appendix. You must justify why you consider the material confidential and make sure it is clearly labeled as such.

You must sign the application form and enclose the application fee (including GST). ERMA New Zealand will not process applications that are not accompanied by the correct application fee. For more information regarding fees refer to our Fees and Charges Schedule on our website at [www.ermanz.govt.nz](http://www.ermanz.govt.nz).

Unless otherwise indicated, all sections of this form must be completed to the best of your ability for the application to be processed.

Please provide an electronic version and a signed hard copy of the completed application form.

All applications to release new organisms by rapid assessment are **not** publicly notified.

If you need additional guidance in completing this form please contact a New Organism Advisor at ERMA New Zealand or email [noinfo@ermanz.govt.nz](mailto:noinfo@ermanz.govt.nz).

*This form was approved on 6 May 2010 by the Chief Executive of ERMA New Zealand acting under delegation from the Authority.*

## Section 1: Application details

a) Application title

Importation of Euphorbia 'Diamond Frost' for ornamental plantings.

b) Organisation name

Container Nurseries

c) Postal address

PO Box 81015,  
WHENUAPAI,  
New Zealand

**Section 2: Provide a plain language summary of the purpose (including proposed use) and potential risks of introducing the organism into New Zealand.**

There are 259 Euphorbia species currently present in New Zealand, as they are listed on MAFs Plant Biosecurity Index. However, Euphorbia 'Diamond Frost' is a new organism because its parent plant, Euphorbia graminea (Jacquin), is not present in New Zealand; therefore, it requires ERMA New Zealand approval for importation and release.

Euphorbia 'Diamond Frost' is a plant that flowers constantly in warm temperate to tropical climates (eg, in Australia, north of about latitude 35 degrees 30 minutes) and in sheltered positions in cooler areas (eg, Melbourne, Latitude 37 deg 49 min south). Euphorbia 'Diamond Frost' will not tolerate frost and in our experience has not over-wintered where temperatures regularly drop below 4o C. As Euphorbia 'Diamond Frost' is almost always in flower, the plant is ideal as a low growing border in garden beds and as a feature in large decorator pots in courtyards or patios. It will make a stunning display either alone or used in combination plantings.

Euphorbia 'Diamond Frost' comes from a selection programme in Europe and Japan. The parent plants have been identified as Euphorbia graminea (Jacquin) by staff at the Brisbane Herbarium. (see email correspondence, Appendix C.) Euphorbia 'Diamond Frost' was produced through radiation in vitro of the parent and subsequent selection of the progeny. The parent species is native to tropical and sub tropical areas of Mexico and into Guatemala and Panama. The species is also present in similar climates in Ecuador, Peru and Columbia. It was selected for its year round flowering, compact growth habit, and lack of seed production.

Euphorbia 'Diamond Frost' has won many awards worldwide for its versatility and performance and has proved to be a relatively hardy, attractive plant for gardens and containers where the climate is suitable. Due to the unique nature of Euphorbia 'Diamond Frost', protection will be sought under Plant Variety Rights (PVR) legislation if approval is given for release. PVR will require the plant to be produced under licence by several growers only and prohibits the propagation and sale to the public by unlicensed individuals or firms.

The aim of this application is to allow the production and sale of 'Diamond Frost' in New Zealand via a small network of licensed growers. Stock for New Zealand will initially be produced from imported tissue culture and later from cuttings.

**Section 3: Identification of the proposed organism to be released**

<b>Family:</b>	Euphorbiaceae
<b>Genus:</b>	Euphorbia
<b>Species:</b>	graminea (cultivar: Diamond Frost)
<b>Common name(s):</b>	Euphorbia Diamond Frost

**Brief description  
(morphological and biological):**

The genus *Euphorbia* consists of over 1600 species of herbs, shrubs or trees with milky sap, of variable habit and cosmopolitan distribution. The stems are often spiny and cactus like and leaves are highly variable when present. The flowers are borne in cyathia and may be terminal or axillary, solitary or clustered. The milky sap of many *Euphorbia* species may produce dermatitis in susceptible individuals; however, we are not aware of any reactions to *Euphorbia* 'Diamond Frost'. The genus is widespread, especially in the Americas. *Euphorbia graminea*, the parent plant of *Euphorbia* 'Diamond Frost', is native to southern areas of Central America and also tropical areas of Ecuador, Columbia and Peru. The popular poinsettia is the most recognisable *Euphorbia*.

*Euphorbia* 'Diamond Frost' is a selection of *Euphorbia graminea*; selection based on its near sterility, constant flower production and compact habit.

**Basic description:** *Euphorbia* 'Diamond Frost' is an erect annual or perennial herb growing to about 0.6m high by about 0.6 wide. Stems are cylindrical, hollow and contain a milky white sap as do most *Euphorbia*; stems are hairless. Leaves are opposite, elliptic, 30 – 50mm long and 10 – 18mm wide, almost hairless above and below, margins entire. Bracts are opposite, numerous and constantly produced, white in colour, and about 10mm long and 3mm wide. Flowers are present all year, white in colour, present as terminal flowers.. No significant seed production has been identified although very occasionally seedlings have been observed in South East Queensland, Australia. With over 100,000 plants having being sold in Australia, we are aware of fewer than 50 seedlings being produced, all to the north of Lat 32 deg Sth.

**Climate and ecological preferences:** *Euphorbia* 'Diamond Frost' is a cold tender herbaceous plant. The parent species is native to the warmers part (tropical, sub tropical) of Central and South America, within 15 degree latitude of the equator. In the USA it is regarded as a zone 10 plant, tolerating temperatures down to 4o C. Our experience in Australia is that it will not tolerate temperatures below 4o C. In New Zealand, *Euphorbia* 'Diamond Frost' is likely to be grown as a container plant or, in areas where minimum winter temperatures exceed 4o C, as a garden ornamental. For comparison, the following lists similar latitudes in Australia and New Zealand:

Australia		New Zealand	
Hobart	43 deg S	Christchurch	44 deg S
Melbourne	38 deg S	Hamilton	38 deg S
Sydney	33.50 deg S	North Cape	34 deg S

'Diamond Frost' has not been grown successfully in Hobart. We have not seen any seed production in Melbourne or Sydney and have

received no reports of seedlings from these areas with over 50,000 plants being produced and sold in these areas.

Additionally, we have conducted a basic comparison using 'Climate Match'. The comparator areas selected were Southern Taiwan (6 locations or stations), where the parent plant is naturalised, and the whole of New Zealand. (4711 locations or stations).

No match was found (Appendix D). This indicates a very different climate between the two regions and hence, little likelihood that the plant will perform in a similar manner in these two areas.

**Habit requirements:** Euphorbia 'Diamond Frost' grows as a low shrub, reaching a height of about 600mm and a width of 400 -600mm at maturity. Euphorbia 'Diamond Frost' requires full sun to part shade (no more than several hours shade per day) to perform at its best. It requires average moisture conditions and will not grow in wet or waterlogged soils. 'Diamond Frost' will grow in a range of soils from sands through to clay loams and prefers a slightly to moderately acid pH, i.e., 5.5 – 7.0. We are not aware of any particular habit requirements which would pose a potential risk.

**Life cycle:** Euphorbia 'Diamond Frost' is regarded as an annual where temperatures drop below 4o C in winter; otherwise it is a perennial persisting for several years. 'Diamond Frost' is a near sterile plant and does not readily produce seed. From experience in Australia, any seed production has been through self pollination as we have noted several plants produced from isolated mother plants. We are not aware of any pollen, seed or propagule dispersal by wind, insects or animals. Euphorbia 'Diamond Frost' does not produce bulbs, rhizomes or tubers; however, we have seen occasional plantlets produced as a result of severing roots through normal garden cultivation.

Commercial propagation of 'Diamond Frost' is only possible through cutting propagation carried out under mist and on heat beds or through tissue culture in a laboratory. Consequently a high level of skill and specialized conditions are required to produce quantities of new plants.

**Competitors and predators:** Euphorbia 'Diamond Frost' is not an aggressive grower and is most unlikely to establish beyond the initial planting. It does not appear to be attacked by common insect pests such as Heliocoverpa, Spodoptera, Aphids, Tetranychid mites or white fly.

As with most Euphorbia, 'Diamond Frost' does produce a white exudate from cut stems. We have not been able to locate any instance of dermatitis or other effects following exposure. As a general precaution, normal gardening practices should be followed.

## Section 4: Identification of risks of releasing the organism

- a) Describe why the organism, after release:
- i. Could not form a self-sustaining population (taking into account the ease of eradication):

### Formation of self-sustaining population

Euphorbia 'Diamond Frost' is near sterile. In the past 3 years in Australia, less than 50 seedlings have been observed from over 100,000 plants grown. All licensed growers have been requested to advise of any seedling production and these observations have been collated by ourselves. All seedlings have been reported from north of Sydney (Lat 33 deg 50 min). Geographically, the few seedlings produced have been reported from areas north of the most northern point of New Zealand (North Cape); although parts of the North Island do encompass Melbourne's latitude, no seedlings have been recorded from Melbourne where approximately 10,000 plants have been produced or Sydney where approximately 40,000 plants have been produced. Occasional seedling production has been reported from the southern part of the USA (below latitude 32 deg N) and it appears to be on a similar small scale to that noted in Australia.

Euphorbia 'Diamond Frost' does not produce stolons or tubers; hence this method of spread is not applicable. Propagation requires human intervention through the production of cuttings. There are four reported instances of severed roots producing plantlets in garden situations in Australia; however, the likelihood of this occurring outside a garden situation is considered remote due to the lack of human intervention to sever roots and relocate small plants.

The parent plant has been identified as having invasive potential in Taiwan and elsewhere however we have noted that wherever 'Diamond Frost' has been grown, there has been no tendency for it to spread. There are morphological differences between 'Diamond Frost' and *E. graminea* such as bract colour (white versus green), flowering period (constant versus intermittent) and we have assumed that the very low seed production in 'Diamond Frost' versus the parent is another effect of the irradiation. Consequently, we do not believe it reasonable to compare the weed potential of 'Diamond Frost' with that of *E. graminea*.

Euphorbia 'Diamond Frost' is a zone 10 plant in the United States and requires winter temperatures greater than 4° C to survive. 'Diamond Frost' could be grown as a glasshouse plant and in fact commercial production is likely to be in glass houses. This type of production gives a further degree of control over any possible movement of propagules. In many areas of New Zealand it would not be expected to survive winter outdoors due to both low temperatures and excessive soil moisture. The top of the North Island is approximately 34 degrees South and based on Australian experience we believe it most unlikely that seed production will occur in New Zealand. Combined with the near sterility we believe it is highly improbable that Euphorbia 'Diamond Frost' could form self-sustaining populations in New Zealand.

### Ease of eradication

Euphorbia 'Diamond Frost' is easily controlled. It is easily killed by pulling out and by a range of selective and non selective broad leaf herbicides. For example, glyphosate, dicamba and glufosinate all of which are registered for use in New Zealand.

- ii. Could not displace or reduce a valued species:

Because Euphorbia 'Diamond Frost' lacks the ability to produce significant quantities of propagules it is highly improbable that it will form self sustaining populations and as such, it is not regarded as representing a potential risk to native or other introduced populations.

Russ Higginbotham of Asset Horticultural Consultants has conducted a weed risk assessment using the Landcare WRA form. The data used in the preparation of this assessment has been derived from our experience in Australia and overseas. The rating derived from this assessment is minus 1 which indicates that 'Diamond Frost' does not have invasive characteristics and is most unlikely to displace native species principally due to it's lack of propagules production. This assessment of risk is attached as Appendix B. A search of overseas data bases has not identified 'Diamond Frost' listed as a weed or an invasive plant. This means that Diamond Frost is highly unlikely to become a weed in New Zealand.

iii. Could not cause deterioration of natural habitats.

Due to factors previously stated, it is considered highly unlikely that Euphorbia 'Diamond Frost' could cause deterioration of natural habitats as the plant is very unlikely to find its way into these habitats.

Euphorbia 'Diamond Frost' is likely to be disposed of by consumers following the death of the plant and as such the potential for propagules being released into the environment is considered remote. Consumers may dispose of live 'Diamond Frost' plants into garden waste, landfill etc; because it does not produce new plants from rhizomes or tubers there is little risk of such propagules producing new plants.

iv. Will not cause disease, be parasitic, or be a vector for disease.

Euphorbia 'Diamond Frost' is not known to be a host or vector for any disease, animal, human or plant, nor is it regarded as having any parasitic attributes. Hence it is considered highly improbable that importation of the plant would be detrimental to health.

v. Will not have any adverse effects on human health and safety, or the environment.

Internet searches have been carried out in an effort to locate any instances of ill effect due to Euphorbia 'Diamond Frost' or *Euphorbia graminea*. Many of the *Euphorbia* produce a dermatitis in susceptible individuals; however, we have not been able to find any record of this problem associated with Euphorbia 'Diamond Frost' or *E. graminea*. Pollen dispersal is not regarded as an issue with 'Diamond Frost' due to its near sterility, hence allergies from pollen dispersal are regarded as highly unlikely. We believe it is highly unlikely that any health problems will occur as a result of handling this plant.

Unlike some *Euphorbia* species, Euphorbia 'Diamond Frost' does not possess thorns or spines and hence is highly unlikely to present a safety problem.

As Euphorbia 'Diamond Frost' is highly improbable of being capable of forming self-sustaining populations in New Zealand and it's relatively short life span of up to several years, it is highly unlikely that any negative environmental effects would occur as a result of cultivating this plant.

vi. Will not have any adverse effect on the relationship of Māori and their culture and traditions with the environment :

We are unaware of any mechanism whereby the import of Euphorbia 'Diamond Frost' would have any effect on the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, valued flora and fauna and other taonga.

b) Does the organism proposed for release have any:

i. Inseparable organisms that cannot be managed by MAF Biosecurity New Zealand?

No inseparable organisms are known.

ii. Affinities with other organisms in New Zealand that could cause an adverse effect to either organism that you have not identified elsewhere?

N/A.

## Section 5: Is there any other relevant information that has not been mentioned earlier?

### Summary

Euphorbia 'Diamond Frost' is widely grown around the world with no reports of any adverse effects on flora or fauna in the environments where it is grown. It is not capable of producing self-sustaining populations without direct intervention by people. In particular, 'Diamond Frost' will generally be grown as a container plant and will be produced only by licensed growers there is a degree of control over distribution and propagation.

The plant is highly unlikely to form self-sustaining populations due to its inability to produce significant amounts of seed and its lack of ability to naturally propagate from stolons, tubers or stems. Any planted population is virtually incapable of spreading.

It is highly improbable therefore that it could displace or reduce any valued species, even if planted deliberately for this purpose. It also cannot have any negative impact on New Zealand's inherent genetic diversity.

There are no records of it causing disease of any sort, is not a parasite and is neither a vector nor a reservoir for any human plant or animal diseases.

There are no recorded negative effects on human health, safety or the environment. There is always the potential for any plant, especially those with milky sap, to cause dermatitis and due care should be taken in handling.

The key use for 'Diamond Frost' is for it to be grown by consumers as a decorative pot or garden plant. The relatively short life span which will vary from less than one year to several years also reduces its risk to the environment.

### Euphorbia 'Diamond Frost' internationally

Euphorbia 'Diamond Frost' has been accepted for importation and is grown as an ornamental plant in containers and gardens in Europe, USA, Canada, Japan and Australia.

We are not aware of any problems which have arisen as a result of the importation and release of Euphorbia 'Diamond Frost' into any of these countries. We have not been able to locate any weed risk assessments carried out on 'Diamond Frost' prior to its importation into these countries. However, we have provided a weed risk assessment for Euphorbia 'Diamond Frost', which was conducted by Russ Higginbotham of Asset Horticultural Consultants. (Appendix B)

Neither Euphorbia 'Diamond Frost' nor its parent plant is listed on the MAF website for unwanted plants. The plant is near sterile, does not reproduce from cut sections without expert human intervention and does not readily form new plants from stem sections in contact with the ground (layering). It may be possible to produce 'Diamond Frost' from root cuttings however this would require human intervention to sever roots and transplant cuttings. Consequently it does not pose a threat to escape from the location where planted. We are not aware of any risk posed by the plant to human health through either ingestion or contact.

### Comparison of Euphorbia 'Diamond Frost' with similar Euphorbia.

Euphorbia 'Diamond Frost' has been compared to other Euphorbia which are similar in habit or are closely related species. Full risk assessments for some of the comparator species are available. Comparator plants:

Euphorbia leucocephala – 'Snow flake' – A medium shrub, perennial, grows 2-3m in warm climates. Frost susceptible. Widely cultivated in warmer areas, introduced into New Zealand approx 1988. Not listed as an environmental weed in NZ. Chosen due its morphological similarities to 'Diamond Frost'. Data

obtained from HEAR and PIER risk assessment.

([www.hear.org/Pier/wra/pacific/euphorbia\\_leucocephala\\_htmlwra.htm](http://www.hear.org/Pier/wra/pacific/euphorbia_leucocephala_htmlwra.htm))

*Euphorbia pulcherrima* – Poinsettia. The commonly cultivated poinsettia. Grown in protected climates and generally sold as an indoor or patio plant as it is not hardy outdoors in cool areas. Not listed as an environmental weed in New Zealand. Data obtained from HEAR and PIER risk assessment.

([www.hear.org/pier/wra/pacific/euphorbia\\_pulcherrima\\_htmlwra.htm](http://www.hear.org/pier/wra/pacific/euphorbia_pulcherrima_htmlwra.htm))

*Euphorbia graminea* – A low shrub to 1m tall, not cultivated. Tropical, grows within 25 degrees of equator. Seeds in wild. Chosen due to parentage of ‘Diamond Frost’. No risk assessment available from PIER but noted as invasive in some tropical locations.

Feature	‘Diamond Frost’	‘Snowflake’	<i>E. pulcherrima</i>	<i>E. graminea</i>
Annual/perennial	Perennial (1)	Perennial	Perennial	Perennial
Tolerates temperatures below 4 deg C	No	Yes (1)	No	No
Frost tolerant	No	No	No	No
Water requirements	Low	Low	Medium	Unknown
Flowering time	Constant	Autumn/ Winter	Winter	Intermittent
Published information expressing weediness concerns	No	No	No	Yes
Causes allergies or otherwise toxic to humans	None recorded.	Yes	No	Yes
Produces quantity of viable seed.	No	Yes	Yes	Yes
Toxic to animals	No	No	Yes	No
Host for recognised pests or diseases.	No	No	Yes	No
Perennial in mild climates	No	Yes(1)	No	No
Established as cultivated ornamental	Yes	Yes	Yes	No
Risk Assessment Score	-1(low risk)	-2 (low risk)	-7 (low risk)	N.A.

(1) = provided it is protected from frost.

The risk assessment for ‘Diamond Frost’ was conducted by ourselves from published data and our own observations. The assessment was carried out prior to obtaining Climate Match data and by rating allergies/toxicity to humans as a ‘1’ when in fact there is no recorded incident. All questions were answered, some by extrapolation from other species. A lower rating would be obtained if these extrapolations did not occur.

## Section 6: List of appendices and referenced material (if applicable)

a) List of appendices attached

Appendix Number	Title
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A	Photographs of 'Diamond Frost'
B	Risk Assessment
C	Emails re nomenclature
D	Climate Match map

b) List of references used- hard copies must be attached to the application form.

Author	Title and Journal
Hortus Third, Staff of the L.H. Bailey Hortorium, Cornell University,	pp 461 – 466 (Genera description)
	<a href="http://www.plantatlas.usf.edu/synonyms.asp?plantID=491">http://www.plantatlas.usf.edu/synonyms.asp?plantID=491</a> (Synonyms)
	<a href="http://www.itis.gov">http://www.itis.gov</a> (Nomenclature)
Narbona et al, Functional Andromonoecy in Euphorbia	
	<a href="http://aob.oxfordjournals.org/cgi/content/full/89/5/571">http://aob.oxfordjournals.org/cgi/content/full/89/5/571</a> (lack of male cyathia)
	<a href="http://plants.USDA.gov/java/profile?symbol=EUGR6">http://plants.USDA.gov/java/profile?symbol=EUGR6</a>

## Section 7: Declaration and signing the application form

In preparing this application I have:

- taken into account the ethical principles and standards described in the ERMA New Zealand Ethics Framework Protocol (<http://www.ermanz.govt.nz/resources/publications/pdfs/ER-PR-05-1.pdf>);
- identified any ethical considerations relevant to this application that I am aware of;
- ensured that my answers contain an appropriate level of information about any ethical considerations identified, and provided information about how these have been anticipated or might be mitigated; and
- contacted ERMA New Zealand staff for advice if in doubt about any ethical considerations.

I have completed this application to the best of my ability and, as far as I am aware, the information I have provided in this application form is correct.

**Signed** \_\_\_\_\_

**Date** \_\_\_\_\_

*Signature of applicant or person authorised to sign on behalf of applicant*

### **Before submitting your application you must ensure that:**

- all sections are completed;
- appendices (if any) are attached;
- copies of references (if any) are attached;
- any confidential information identified and enclosed separately;
- the application is signed and dated;
- your application fee has been paid or is enclosed; and
- an electronic copy of the final application is e-mailed to ERMA New Zealand.