

He tono nā



Te Rūnanga o NGĀI TAHU

ki te

**ENVIRONMENTAL PROTECTION AUTHORITY**

e pā ana ki te

**EPA APPLICATION APP201774 – Release of *Neotyphodium endophytes*.**

17 December 2013

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**Request to be heard**

Te Rūnanga o Ngāi Tahu wishes to appear to speak to this response.

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## 1. Executive summary

Te Rūnanga o Ngāi Tahu has consistently urged a reduction in the use of environmentally harmful agrichemicals and pest control tools and encouraged the development of new technologies aimed at limiting the deployment of such toxins. Innovative endophyte-containing ryegrasses have already achieved this in the pastoral sector. We consider that the development of pest and disease resistant endophyte-containing cultivars of key cereals will not only have production and economic benefits for the arable sector - which includes Māori farming enterprises - but will significantly reduce the use of synthetic chemicals in arable cropping. At the same time, we are cautious regarding the public acceptability of cereals containing these endophytes entering the human food chain and urge the researchers to openly address the issue with the wider public.

We are also unsure of the stability of plant/endophyte associations, and the possibility of the unexpected production of mammalian-toxic secondary metabolites, such as ergovaline.

We support the release of the *Neotyphodium* endophytes from containment.

## 2. Te Rūnanga o Ngāi Tahu

2.1 This response is made on behalf of Te Rūnanga o Ngāi Tahu (Te Rūnanga). Te Rūnanga is statutorily recognised as the representative tribal body of Ngāi Tahu Whānui and was established as a body corporate on 24<sup>th</sup> April 1996 under section 6 of Te Rūnanga o Ngāi Tahu Act 1996 (the Act). We note the following relevant provisions of our constitutional documents:

(a) Section 3 of the Act States:

This Act binds the Crown and every person (including any body politic or corporate) whose rights are affected by any provisions of this Act.

(b) Section 15(1) of the Act states:

Te Rūnanga o Ngāi Tahu shall be recognised for all purposes as the representative of Ngāi Tahu Whānui.

(c) The Charter of Te Rūnanga o Ngāi Tahu (1993, as amended) constitutes Te Rūnanga as the kaitiaki of the tribal interest.

2.2 Te Rūnanga respectfully requests that this response is accorded the status and weight due to the tribal collective, Ngāi Tahu Whānui, currently comprising over 49,000 members registered in accordance with section 8 of the Act .

### **3. Te Rūnanga statements of position on APP201835**

#### **3.1 General comments**

Ngāi Tahu holds concerns over the longstanding and widespread use of toxic chemicals and other agrichemicals in the horticultural and agricultural sectors. At the same time, we recognize the need to tackle those weeds, pests and diseases which reduce the efficiency and profitability of the farming sector. The consistent position that Ngāi Tahu has taken over the years is: first, to reduce if not eliminate the use of these chemicals and the resulting potential environmental contaminations that they cause, and, second, to support the development of alternative less environmentally damaging pest control strategies.

##### **3.1.1 Endophytes and pest management**

The development of pest resistant pasture grasses through the utilization of endophytic fungi has transformed pastoral farming, at least from the pest management point of view. As the applicant explains, pest-resistant ryegrass and fescue cultivars have been incorporated in pastoral systems for some years with considerable benefit to production, reduced use of pesticides, and no apparent adverse effects. The present application seems to us to offer similar benefits to the arable sector.

#### **3.2 The proposal**

We find that while the application explains the big picture of the development and use of the cereal/endophyte associations at some considerable length, it does not adequately detail the actual objectives of the applicant envisaged by the release from containment, i.e. just what material is to be taken out of containment should the application be approved. Some discussion with the applicant was needed to ascertain that it will be living plants (or their seeds) containing one or other of the

numbered 45 fungal strains which will be released from containment (John Caradus, pers. comm.). And we understand that at present the only infected plants to be removed from containment will be rye corn – it has not yet proved possible to insert the endophyte into other cereals of interest.

### **3.2.1 Human food chain**

Rye corn is not likely to enter the food chain. However, the applicant has explained that a key objective is to infect wheat and barley with one or other endophyte, in order to protect these species against pest or fungal attack (John Caradus pers. comm.). Discussion has clarified that cereal/endophyte associations which lead to the production in the plant of the bioactive loline will be a focus of the research. While we accept the published evidence that the metabolites peramine and loline are not toxic to mammals, there is nevertheless an issue regarding the long-term aim of producing for human consumption wheat and barley, and possibly rye and oats, containing such bioactives. It is an issue which should have been explicitly addressed in the application, but which was not. To date, only farmed animals have been fed peramine- or loline-containing grasses and these have been shown to be safe. But we can foresee objections to the production of loline-containing cereals for human consumption, and suggest that research on public attitudes to this form of modification of staple human foods be undertaken. The trade-off for the consumer, of course, is a more sustainably-produced food, grown with a much-reduced dependence on toxic agrichemicals.

### **3.2.2 Stability of secondary metabolite production**

We note that many of the endophyte strains produce chanoclavine (see pp. 6-7). This metabolite is not itself toxic to livestock and so is not, presumably toxic to humans (p. 17). However, it is an intermediary in the ergovaline pathway, and ergovaline **is** a known human toxin (ergot poisoning) (p. 17). This raises in our minds the possibility that plant/endophyte associations that are reported as being 'safe' and not producing mammalian-toxic metabolites, might suddenly change and begin to do so. The question is one of the stability of the secondary metabolite production. The application says nothing about this matter, which seems to us to require further discussion and/or research.

### **3.2.3 Impacts on Māori**

We note the information in the application resulting from the applicant's engagement with Māori organisations. We support the matters raised by Te Rūnanga Ō Te Aupouri and Ngāti Whātua Ōrakei, and consider that the applicant's responses dealt adequately with them. We do not consider that there will be a negative impact on native species or ecosystems; rather there is likely to be a benefit from the reduction in the use of pesticides (as noted by Te Rūnanga Ō Te Aupouri).

Māori arable farmers should be able to gain productivity gains and economic benefit from the newly-created cereal cultivars, as Māori pastoral farmers have from the endophyte-containing ryegrass cultivars.

### **4. Recommendation**

Te Rūnanga o Ngāi Tahu supports the release from containment of non-toxic *Neotyphodium* fungi.

We would like our submission to be heard.