Facial eczema management protocols used on dairy farms in the North Island of New Zealand and associated concentrations of zinc in serum

EL Cuttance^{*§}, MA Stevenson[†], RA Laven[‡] and WA Mason^{*}

^{*} VetEnt, 49 Benson Road, Te Awamutu, New Zealand
[†] Faculty of Veterinary and Agricultural Sciences, University of Melbourne, Parkville, Victoria 3010, Australia
[‡] Institute of Veterinary, Animal and Biomedical Sciences, Massey University, Palmerston North, New Zealand
[§] Author for correspondence. Email: emma.cuttance@vetent.co.nz

Supplementary Figure 1. Dot plot of spore counts from the all the different farms in the different regions. Each dot represents a spore count from one paddock. Each letter represents a separate farm.

The content of this supplementary information has not been edited. All risk and liability rest with the authors.

Supplementary Figure 2. Boxplots of concentrations of zinc in serum ($\mu\text{mol/L}$) of 911 dairy cows on 91 farms from the North Island of New Zealand that supplemented zinc for the prevention of facial eczema. The median value is indicated by the bold line, with the upper and lower edges of the boxes indicating the 75th and 25th percentiles, respectively, and the whiskers indicating ± 1.5 -times the interquartile range (IQR). Outliers, shown as black circles, represent values more than 1.5-times the IQR. The horizontal dotted lines represent 18 and 35 $\mu\text{mol/L}$ zinc in serum.

Supplementary Figure 3. A recommended protocol for facial eczema monitoring and use of zinc for control in dairy cows.

The basis for these recommendations is provided in the following references:

Use of spore counting to determine risk period for facial eczema

- Brook P.** Ecology of the fungus *Pithomyces chartarum* (Berk. & Curt.) MB Ellis in pasture in relation to facial eczema disease of sheep. *New Zealand Journal of Agricultural Research* 6, 147-228, 1963
- Brook P.** Growth cycle of the fungus *Pithomyces chartarum* (Berk. & Curt.) MB Ellis. *New Zealand Journal of Agricultural Research* 7, 87-9, 1964
- Clare NT, Gumbley JM.** Some factors which may affect the toxicity of spores of *Pithomyces chartarum* (Berk. & Curt.) M.B. Ellis collected from pasture. *New Zealand Journal of Agricultural Research* 5, 36-42, 1962
- Collin RG, Briggs LR, Towers NR.** Development and evaluation of an enzyme immunoassay for sporidesmin in pasture. *New Zealand Journal of Agricultural Research* 38, 297-302, 1995
- Davison S, Marbrook J.** The effect of temperature on the toxicity of spores of *Pithomyces Chatarum*. *New Zealand Journal of Agricultural Research* 8:1, 126-30, 1965
- Di Menna M, Bailey JR.** *Pithomyces chartarum* spore counts in pasture. *New Zealand Journal of Agricultural Research* 16, 343-51, 1973
- Dingley JM.** *Pithomyces chartarum*, its occurrence morphology, and taxonomy. *New Zealand Journal of Agricultural Research* 5, 49-61, 1962
- Oldman L, Di Menna M. Facial Eczema:** Predicting danger periods by spore counting. *Aglink FPP*. 494. New Zealand Ministry of Agriculture and Fisheries, Wellington, 1983
- Thornton R, Sinclair D.** Some observations on the occurrence of *Sporidesmium bakeri* Syd. and facial eczema disease in the field. *New Zealand Journal of Agricultural Research* 3, 300-13, 1960

Measuring zinc concentrations and GGT activity

- Blackshaw C.** Serum gamma glutamyltransferase in the diagnosis of liver disease in cattle. *New Zealand Veterinary Journal* 26, 16-26, 1978
- Smith BL.** Controlling facial eczema in sheep using zinc salts. *Proceedings of the Society of Sheep and Beef Cattle Veterinarians of the New Zealand Veterinary Association* Pp. 227-233., 1987
- Towers NR, Smith BL.** The protective effect of zinc sulphate in experimental sporidesmin intoxication of lactating dairy cows. *New Zealand Veterinary Journal* 26, 199-202, 1978
- Towers NR, Stratton G.** Serum gamma-glutamyltransferase as a measure of sporidesmin-induced liver damage in sheep. *New Zealand Veterinary Journal* 26, 109-12, 1978