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Exotic weed seeds detected from imported small cereal grains into Japan during 1990s'

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Summary:
Imported agricultural materials are a principal source of exotic weed seeds into Japan. Increasing the amount of imported livestock feed, which is inadvertently contaminated with weed seeds or other propagules, has produced a high ecological risk. Small cereal grains and rapeseed imported through the major feed port of Kashima from 1993 to 1995 were thoroughly inspected for weed seeds. Twenty-nine lots of wheat, barley, rye, oats and rapeseed imported from Australia, Canada, Finland, Germany and the USA were examined, and more than ninety contaminating plant species were identified. Ordination by multivariate analysis identified a distinct association between species composition of the contaminant and the region of origin. Clusters in DCA coordinate space were grouped into US, Canadian, European and Australian lots. Mustard species (*Brassica* spp.), which were found in twenty-five of the lots, was the most abundant contaminant. *Chenopodium album*, *Avena fatua*, *Fallopia convolvulus*, *Setaria viridis*, *Persicaria* spp. and *Thlaspi arvense* were found in more than half of the sample lots. Mustard seeds found in cereals were germinated to confirm their identities. They were *B. napus*, *B. juncea*, *B. rapa* and *B. kaber*. The seeds of *B. napus*, which were particularly abundant in Canadian lots, were likely volunteer canola from cereal fields in crop rotation. In recent years, genetically modified canola varieties have been incorporated in shipments to Japan. Some lots were also contaminated with *Avena fatua* and *Lolium* spp., recently reported as problems in the

continuous winter cereal cropping system in central Japan.

Keywords: imported small grain, winter cereal, weed seeds, rapeseed, unintentional introduction

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