The Possibility of Contamination of Peruvian Guano by Potato Cyst Nematode*

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INTRODUCTION

The potato cyst nematode, *Heterodera rostochiensis* Woll., **** was found for the first time in Hokkaido, Japan, in 1972. After a series of investigations, Peruvian guano was considered to be one of the possible means by which this nematode was introduced into Japan. Some viable cysts of this nematode were detected in guano which was imported from Peru and had been used by commercial growers in the area where the nematodes were found. Accordingly, the possibility of contamination of guano by natural and artificial means were investigated. Guano from selected islands as well as soil samples on adjacent areas were examined for presence of cysts. There is little agricultural land on the Peruvian coast as the ecology is that of a dry desert with the exception of about 40 river valleys which come down from the Andes and make irrigated agriculture possible, thus the possibility of large scale contamination is reduced. Moreover potatoes are not a coastal traditional crop and are only cultivated in four valleys being introduced not further than 10 years ago.

MATERIALS AND METHODS

Twenty guano samples were obtained during visits to four guano islands. One sample was supplied by a commercial user in Huancayo. Two packaged guano samples, kept for examination prior to shipment from Chimbote, and three samples from the FERTIPERU (Peruvian Fertilizer Co.) warehouse which came from different locations were also provided. Thirty-one soil samples were collected in the coastal fields of potatoes and other crops. These samples were washed on the 70-mesh screen after being dried under room conditions. The materials on the screen were spread over filter papers and examined under a dissecting microscope.

In addition, several FERTIPERU personnel were interviewed to learn about conditions on the Peruvian guano islands and the process of guano production.

RESULTS AND DISCUSSION

After a thorough examination, one cyst was found in one of five guano samples collected near the nests of guanay cormorants on Mazorca Island (Fig. 1). This cyst was identified as the potato cyst nematode according to morphological observations such as those of the shape and pattern of the cyst and the second stage larvae. It was not possible to identify the species or

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****In preparation of this manuscript, generic name of the species was transferred to *Globodera* by Mulvey and Stone (1976).
The encysted larvae and eggs were found to be viable, because a few second stage larvae emerged from the cyst after being cut and they showed movement in water on a watch glass. Some of these larvae were used for inoculating a potato seedling grown in a 9-cm clay pot, but the multiplication was unsuccessful.

A second examination of guano, sampled later on Mazorca Island by the junior author, failed to confirm the existence of cysts.

Two soil samples from coastal fields were found to be infested with cysts, possibly of the potato cyst nematode, though the level of the population was very low.

The finding of the cyst in the guano samples on one of the Peruvian guano islands supports the previous report on the contamination of Peruvian guano by the potato cyst nematode. However, the means of contamination is not clear yet.

Although the majority of birds which produce guano are guanay cormorants (Phalacrocorax bougainvillii), Peruvian boobies (Sula variegata), and Peruvian pelicans (Pelecanus thagus), there were many other kinds of birds on the islands. Among them seagulls (Larus spp.) were numerous.

Seagulls were also observed in fields in the coastal area as well as in the Andean mountains. They gather in fields just after ploughing, probably to eat worms and insects in the soil. These seagulls are potential carriers of the nematode cysts.

The chance of contamination during the processing of guano for shipping was also considered in the interviews, but no obvious source could be detected. The possibility of using contaminated sacks on the islands was discarded as every person interviewed denied this. As no island is producing guano at the moment, it could not be verified by direct observation.

Further investigation on the possibility of contamination by mixing guano from different islands and peninsulas is necessary. Also the possibility of potato peelings being discarded on the islands should be examined.

LITERATURE CITED


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