NEW DISEASES OF ASPARAGUS – A THREAT TO NEW ZEALAND’S BIOSECURITY

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ABSTRACT

Three diseases, asparagus rust, *Phomopsis* stem blight and asparagus anthracnose, were detected for the first time during 2000 on asparagus in Australia. These diseases, especially asparagus rust, are likely to spread to other states in Australia and New Zealand. They are a threat to New Zealand’s biosecurity. Early detection of the diseases and application of control measures are essential to prevent the diseases spreading and enable eradication.

Keywords: asparagus, *Colletotrichum gloeosporioides*, new diseases, *Phomopsis asparagi*, *Puccinia asparagi*.

INTRODUCTION

In March 2000, stem rust symptoms were discovered in a crop of asparagus, *Asparagus officinalis* L. cv. UC 157 F1, at a property near Ipswich in south-east Queensland, Australia. At the same time severe stem blight was found on asparagus plants growing near Toowoomba in south-east Queensland and anthracnose was also recorded at the same property. These three diseases have not been recorded on asparagus in New Zealand.

ASPARAGUS RUST

Asparagus rust, caused by *Puccinia asparagi* DC. in Lam & DC., was first recorded in Australia by Davis (2001b). Symptoms on stems are elongated lesions containing small, orange-red pustules arranged in concentric rings (Fig. 1). Close examination reveals the presence of darker, elongated masses of red urediniospores (Fig. 2). Three months after initial discovery of the disease, black telia were evident in the stem pustules (Fig. 3).

Asparagus rust has not been reported in other Australian states, but the disease has recently been recorded on a further nine properties up to 250 km north of the original outbreak. The disease now appears to be well established in all major asparagus production areas of Queensland, and *P. asparagi* is eventually likely to be disseminated to other states on air currents. Asparagus rust destroyed asparagus production in the eastern US when it first arrived there from Europe. The race of rust affecting Australian crops is thought to have originated from California. There is a strong possibility that this race will reach New Zealand in the next few years (NZ Asparagus Council 2001).

PHOMOPSIS STEM BLIGHT

Phomopsis stem blight, caused by *Phomopsis asparagi* Sacc., was first recorded in Australia by Davis (2001a). It is likely that other *Phomopsis* spp. are also present as it is thought that this disease is caused by a pathogen complex (Davis 2001a). The most devastating symptom associated with *P. asparagi* is stem blight (Fig. 4), which causes fern death and, as seen in subsequent regrowth, debilitates and reduces stands of plants in spring. Infected stems senesce rapidly following infection, even if just a single lesion is apparent on the fern.

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FIGURE 1: Asparagus rust symptoms showing elongated lesions containing small pustules which are orange-red.

FIGURE 2: Asparagus rust symptoms showing dark, elongated masses of urediniospores which are red.

Inoculation tests performed on potted asparagus have established *P. asparagi* as the pathogen causing the field symptoms (Davis 2001a). Lesions became visible within 8-9 days of inoculation, but full lesion development, including the appearance of sub-epidermal and erumpent pycnidia, took 13-20 days. By the time full lesions had developed, complete fern death had usually occurred.

Phomopsis asparagi is likely to disperse over longer distances on infected plant material but its ability to travel short distances during wet, windy conditions is probably quite good. Stem blight is endemic in Asia where it causes serious damage to asparagus plants (Hsu & Sun 1969). There seems to be no reason to expect the pathogen to remain sub-tropical in its distribution because other species of *Phomopsis* are known to occur in temperate areas. For example, *Phomopsis* is a common pathogen of grapes in southern areas of Australia.

ASPARAGUS ANTHRACNOSE

Asparagus anthracnose is caused by the fungus *Colletotrichum gloeosporioides* (Penzig) Penzig & Saccardo. This pathogen had devastating effects on asparagus production on a property in the Northern Territory of Australia in 2000, and isolates of *Colletotrichum* have been recovered from Queensland asparagus during 2000 survey (R.D. Davis, unpubl. data). Symptoms appear as light yellowish lesions, which contain black acervuli bearing conidiophores and conidia (Fig. 5). The significance of this disease remains unclear. However, Australian growers are concerned about it and have called for its investigation together with studies of asparagus rust and stem blight.

FIGURE 3: Asparagus rust symptoms showing black telia in pustules.

FIGURE 4: Phomopsis stem blight showing stem blight lesions.

FIGURE 5: Asparagus anthracnose symptoms showing lesions which are yellowish and contain black acervuli.

DISCUSSION

No etiological or epidemiological research has been undertaken on any of these diseases in Australia or New Zealand. These diseases are likely to spread to other states where asparagus crops are grown. The most likely disease to spread widely is asparagus rust. The urediniospores of rust are air-borne, and can travel long distances with the wind. Asparagus rust is very likely to occur in New Zealand in the next few years (NZ Asparagus Council 2001). The other two diseases are likely to spread more slowly than rust, but are likely to eventually move to other states in Australia and New Zealand. Early detection of these diseases and application of appropriate control measures are essential to avoid infection and crop yield losses.

A research project is being planned to investigate the etiology and epidemiology of these diseases, and to determine methods for their management using fungicides and resistant cultivars. A proposal has been drafted for the NZ Asparagus Council, the NZ Public Good Science Fund and the HAL (Horticulture Australia) for funding. The project will commence with a review of all literature on asparagus diseases, with particular reference to material published on research on the foliar pathogens. Crop surveys will be carried out to identify the pathogens found in asparagus crops in Australia and in New Zealand. Field trials will evaluate fungicides for the control of these pathogens, while glasshouse and field trials will screen asparagus varieties for relative susceptibility to the diseases. Field disease management studies will investigate the carry-over inoculum on the old fern, its survival over winter and on alternative hosts. This knowledge will help to develop adequate management methods that will be of immediate use in Australia, and may be required if the diseases occur in New Zealand.

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