PRELIMINARY OBSERVATIONS OF DISEASES ON PERSIMMON (*DIOSPYROS KAKI*) AND THEIR POTENTIAL EFFECT ON FRUIT QUALITY

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New Zealand must establish a reputation for producing uniform high quality fruit to compete and maintain market share. In Japan, market prices for persimmon are sensitive to fruit quality and quantity (Anon. 1986). At present, there is limited competition from other southern hemisphere countries but recent plantings have been established, and competition from these countries can be expected in the future (Mowat 1990).

Diseased samples were sent to MAF Technology, Ruakura by MAF consultants to be identified. Disease symptoms and signs of disease were observed macroscopically and microscopically. Fruiting bodies and spores present were measured before isolations. Diseased tissues were also placed in humidity chambers (>95% RH) to aid fungal growth, sporulation, and identification. Diseased tissues were surface sterilised with 70% ethanol for 30 seconds, air dried in a laminar flow cabinet and plated aseptically onto potato dextrose agar (PDA). Plated cultures on PDA were incubated at ca. 20 °C with a 12 h light/12 h dark cycle. Fungal growth was observed macroscopically and microscopically, and identified to genus level.

The results of the isolations and identifications are presented in Table 1. Some new pathogens previously not reported on persimmons in New Zealand were isolated while other fungi isolated confirmed some of the diseases reported in a previous study by Prestidge *et al* (1988).

Botryosphaeria sp. was observed from perithecia under raised pustules from pruned twigs. Under high humidity, clear coloured spore horns (cirrhous) with asci and ascospores were observed. *Botryosphaeria* has a wide host range and causes dieback and cankers on several horticultural crops (Pennycook 1989). Species of *Phoma* and *Phomopsis* were observed from pycnidia under raised pustules from dried twigs. *Pestalotia* sp. and *Fusicoccum* sp. were isolated from dried calyces and skin of fruit (Table 1). In Japan, *Pestalotia* spp. were reported to affect 8% of persimmons stored for 150 days (Tarutani *et al* 1970). The calyx is an important respiratory organ and has a major influence on the development of persimmon fruit (Kitigawa 1982). Blackening of calyces may affect both fruit quality and development. Dried leaves yielded *Colletotrichum* sp. with orange coloured ooze from acervuli under high humidity. *Alternaria* sp. with dark sporulation zones and *Botrytis cinerea* with grey mycelial growth and sporulation were observed on dried leaves (Table 1).

Persimmon stored at 0 °C for 6 weeks and then at room temperature (15-25 °C) developed storage rot (Table 1). Storage rot fungi observed and isolated were mainly *Botrytis cinerea*, *Penicillium* sp., *Colletotrichum* sp., *Phoma* sp., *Phomopsis* sp., *Mucor* sp., *Fusarium* sp. and *Alternaria* sp. (Table 1). *Botrytis cinerea*, *Penicillium* sp. and *Colletotrichum* sp. are important post-harvest pathogens causing storage rots of many horticultural fruit (Pennycook 1989).

On fresh leaves, circular brown specks (<1 mm) yielded creamy bacterial colonies (not identified) and *Phoma* sp. (Table 1). Species of *Phoma*, *Colletotrichum*, *Alternaria*, *Botrytis* and *Pestalotia* were isolated from dark brown to black spots (>2 mm), sometimes with diffused yellow haloes around the spots (Table 1). The potential for *Alternaria* sp. to cause leaf spots and post-harvest storage rot under New Zealand

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TABLE 1: Isolations of fungi from diseased persimmon leaves, twigs, fruit.

Symptoms	No. of samples	Isolates	Fungi
Persimmon stored at 0°C for 6 weeks and then 2 weeks at room temperature			
Brown rot with grey mould	30	30	30 <i>Botrytis cinerea</i>
Brown rot with green mould	5	5	5 <i>Penicillium</i> sp
Brown rot with pin-mould	2	2	2 <i>Mucor</i> sp
Brown spots with dark edge	1	4	4 <i>Phomopsis</i> sp
Brown rot or blemish with raised acervuli and orange ooze	7	32	32 <i>Colletotrichum</i> sp
Brown rot with yellow mycelium	1	8	8 <i>Fusarium</i> sp
Dark russeted blemish (humidity marking) 10 mm size	1	8	8 <i>Phoma</i> sp
Dried persimmon leaves			
Raised acervuli with orange ooze	3	12	12 <i>Colletotrichum</i> sp
Black fungal sporulation	3	16	16 <i>Alternaria</i> sp
Grey mould	3	16	12 <i>Botrytis cinerea</i>
Dried fruit skin and calyces of persimmon fruit			
Raised pustules			
Dried fruit skin	4	16	1 <i>Pestalotia</i> sp 2 <i>Fusicoccum</i> sp
Dried calyces	4	16	3 <i>Pestalotia</i> sp 4 <i>Fusicoccum</i> sp
Dried twigs			
Raised pustules	2	16	2 <i>Phomopsis</i> sp 13 <i>Phoma</i> sp
Raised pustules with perithecia	6	12	12 <i>Botryosphaeria</i> sp
Fresh persimmon leaves			
Black spots <1 mm diffused haloes	27	80	3 bacterial 7 <i>Phoma</i> sp
Black spots >2 mm with diffused haloes	10	40	4 <i>Alternaria</i> sp 7 <i>Colletotrichum</i> sp 16 <i>Phoma</i> spp 2 <i>Botrytis</i> sp 1 <i>Pestalotia</i> sp
Calyces from young developing persimmon			
Black spots >0.5 mm	18	60	5 <i>Alternaria</i> sp 5 <i>Colletotrichum</i> sp

conditions has yet to be established. In Israel, *Alternaria alternata* has been reported to cause necrotic leaf spots and black spot in stored persimmons (Prusky *et al* 1981).

The importance of these fungi as plant pathogens has yet to be determined and quantified. There is little information on the present status of persimmon diseases under New Zealand conditions. However, preliminary observations showed that storage rot fungi, *B. cinerea*, *Penicillium* sp. and *Colletotrichum* sp. could reduce the storage life and quality of persimmon fruit.

Tests will be conducted on fungal isolates to determine pathogenicity (Koch's postulates) and their effect on persimmon. Future research will involve a disease survey of persimmon in the main growing regions in the North Island to determine incidence and severity of persimmon diseases which affect quality and yield of persimmon.

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