CSIRO PUBLISHING
www.publish.csiro.au/journals/apdn *Australasian Plant Disease Notes*, 2006, **1**, 33–35

Leaf spot of cultivated and wild *Alstroemeria* spp. caused by *Asperisporium alstroemeriae*

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Abstract. *Asperisporium alstroemeriae* (Allesch.) Maubl., the causal agent of leaf spot on *Alstroemeria* spp., is recorded for the first time in Argentina on commercial hybrids and on the native species *A. psittacina.* It appears that cultivated hybrids of *Alstroemeria* spp. and *A. psittacina* are new hosts for this pathogen. Disease symptoms and fungal description are provided.

Alstroemeria (*Alstroemeria* spp.) is a cut flower crop that was obtained by crossing indigenous *Alstroemeria* species from South America. Breeding lines of commercial interest were bred in Europe to improve flower characteristics and to select for plant type in a different environment. There is increasing international interest in this crop which is now widely grown. Commercial plantings of commercial varieties began in Argentina at the end of the 1990s (Morisigue *et al*. 2003). The dominant cropping areas are located around La Plata city (34°55′S, 57°57′W) in Buenos Aires Province. Shortly after, in a commercial planting of *Alstroemeria*, symptoms of leaf spots were observed alone or together with a rust (Rollán *et al*. 2005). The disease spread rapidly in cropping areas. Plants of *A. psittacina* Lehm., which grow wild or in home gardens in Buenos Aires Province, were also observed showing identical symptoms of this disease. As the result of isolation tests, the same fungus was isolated from this host.

Symptoms consisted of spots, at first chlorotic with an oily appearance, then necrotic, irregular, scattered or confluent, and light brown in colour. They were located on the upper surfaces of the leaves, were enlarged and limited by the veins (Fig. 1). Conidia, conidiophores and stromata of a cercosporoid fungus developed on the lower surfaces of the leaves from the centre to the borders of the elongated spots (Fig. 2*a*, *b*). In severe cases, the petioles were also infected, the spots became confluent and the leaves died. The disease begins in the basal leaves and progresses to the upper ones (Fig. 1). It causes defoliation and reduces the aesthetic value of affected flowering branches, thereby reducing the market value of the cut flowers.

Fig. 1. Chlorotic spots on the upper surface of the basal leaves of *Alstroemeria* cv. Rebeca naturally infected by *Asperisporium alstroemeriae* in greenhouse plots. Bar = 5 cm.

Colonies which developed on the leaves were hypophyllous, punctiform and confluent, olivaceous grey with new external colonies hyaline (Fig. 2*b*). Internal mycelia form stromata at first hyaline and then olivaceous grey. Conidiophores were grouped in dense fascicles, numerous to very numerous, sporodochial, erect, mostly straight, subcylindiric, unbranched, pale green-olivaceous, wall verrucose–subrugose, 105–150 µm (av. 117), three to six septa (Fig. 3*a*). Conidia were solitary, obpyriform, obclavate, 15–26 µm (av. 20.3) × 7–11 µm (av. 8.2), up three septa, but usually one septum, often constricted at the septa,

 10.1071/DN06015 1833-928X/06/010033

Fig. 2. Colonies of *A. alstroemeriae* with conidia and conidiophores forming longitudinal leaf spots. (*a*) Fungal colonies emerging from the cuticle of the lower surface of an *Alstroemeria* leaf. Bar = 1 cm. (*b*) Detail of grouped fungal colonies limited by veins, showing dark olivaceous fascicles of old conidiophores and conidia in the centre and younger hyaline ones in the edges. Bar = 0.2 cm.

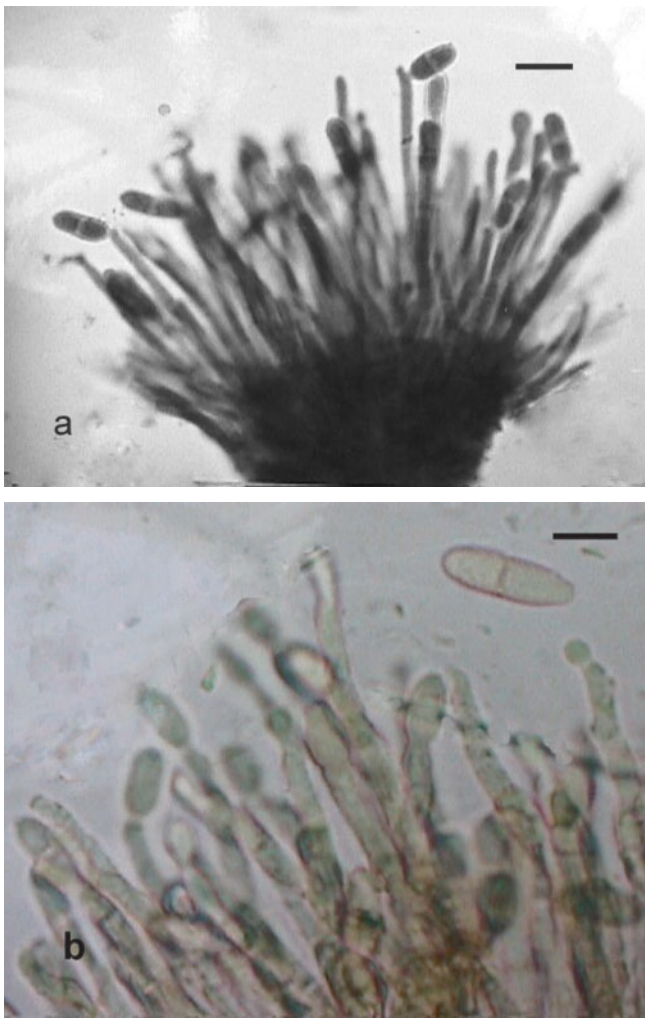

Fig. 3. (*a*) Fascicles of conidiophores and conidia (cotton blue in lactophenol). Bar = 20 µm. (*b*) Conidiophores supporting immature single conidia and one mature detached (lactophenol). Bar = 10 µm.

pale olivaceous, rugose–verrucose, apex broadly rounded, base truncate, hylium somewhat thickened and darkened (Fig. 3*a*, *b*).

In an attempt to isolate the pathogen, pieces of affected leaves were surface-sterilised with 0.5% NaOCl for 1, 1.5 and 2 min and washed twice with sterile water. They were transferred to Petri dishes with potato dextrose agar (PDA), vegetables juice agar (V8A) and *Alstroemeria* leaf extract agar (AEA) (200 g *Alstroemeria* leaves, 20 g glucose, 20 g agar, 800 mL distilled water). In addition several colonies of the fungi emerging from the symptomatic leaves were transferred to slants of the same media. These methods were unsuccessful. Chambers and Fukenberg (1987) also failed to obtain isolates of *Asperisporium caricae* from infected pieces of sterilised leaf tissues on various tests media. They obtained satisfactory results only on 3 of 29 tested media using single conidia.

In the present study, isolates were obtained when leaf pieces were deposited on agar with their upper surfaces touching the media. Thus, new conidiophores and conidia which developed slowly on the leaf pieces after 20–25 days were transferred to slants of PDA and slowly developed dome shaped and compact colonies (3 mm in diameter at 35 days, 8 mm in diameter at 4 months).

Pathogenicity tests were conducted by the application of the inoculum suspension [10^5 propagules/mL with the addition of a tensiactive solution or water (controls)] with a brush, on potted plants of *Alstroemeria* hybrids cv. Rebeca. Inoculated plants were covered with plastic bags for 72 h and kept in a greenhouse at 17–23°C. Twenty-five days after inoculation, transluscent and chlorotic spots were observed on the leaves. Eight to ten days later, on the lower leaf

surfaces, lesions turned olivaceous-grey as consequence of the formation of fungal colonies resembling natural infections. Leaves became chlorotic and died. The fungus re-isolated from these lesions was identical to that originally isolated from naturally infected plants.

Based on symptoms and cultural and morphological characteristics the fungus was identified as *Asperisporium alstroemeriae* (Allesch.) Maubl. This was confirmed by U. Braun, Martin-Luther-Universität Institut für Geobotanik und Botanischer Garten, Halle (Saale), Germany (material deposited at HAL 1752).

The wild *Alstroemeria* species, for example *A. psittacina*, could be a natural inoculum reservoir from where the pathogen is able to spread to commercial plantings. Preliminary observations in several greenhouses, where different cultivars of *Alstroemeria* hybrids were cropped, showed that all cultivars were susceptible to leaf spots. The only record found of this pathogen, named as *Scolicotrichum alstroemeriae* Allesch., was cited by Viégas on *Alstroemeria* spp. in South America (Viégas 1961). This is the first report of *A. alstromeriae* on commercial *Alstroemeria* spp. and on *A. psittacina* in Argentina. It appears to be also the first record on both hosts in the world.

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Accepted 15 October 2006