POTENTIAL BIOLOGICAL CONTROL AGENTS AMONGST FUNGI ASSOCIATED WITH THE WEED *ZANTEDESCHIA AETHIOPICA* IN SOUTH-WESTERN AUSTRALIA

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INTRODUCTION

Zantedeschia aethiopica (arum lily) (Araceae) is a noxious weed in south-western Australia (1). Herbicides are either ineffective and/or inappropriate for its control in native forest and bushland. Biological control offers an attractive alternative to chemical means in that it is capable of providing a greater degree of host specificity, and once initiated the control organism is self perpetuating. A search for insects in South Africa, the centre of origin for this weed, found no suitable seed eating insects of Z. *aethiopica* (2). A search for pathogens of Z. *aethiopica* as potential biological control agents has not been conducted either in South Africa or Australia. In this study, the populations of Z. *aethiopica* in south-western Australia were surveyed for fungal pathogens to identify potential mycoherbicide canditates.

MATERIALS AND METHODS

Twenty nine sites infested with Z. *aethiopica* were visited throughout south-western Australia. Rhizomes, roots and shoots of plants showing symptoms of disease were collected and returned to the laboratory. Pieces cut from lesion fronts were were washed, surface sterilised (1.5% NaOCl for 2 min. followed by 3 rinses in sterile deionised water) plated onto the following selective and 'non-selective' media; PCNB, P5ARPH, P5ARP, Water Agar and 1/2PDA + Streptomycin sulphate. Pure cultures were obtained and identified according to standard mycological keys.

RESULTS

The survey revealed low levels of endemic disease in Z. *aethiopica* populations. The most commonly observed symptoms of disease were soft rots of roots and rhizomes (28 sites). These rots were not associated with above ground symptoms such as chlorosis or wilting. Necrotic leaf spots circumscribed by a chlorotic halo later becoming a 'shot-hole', were observed on Z. *aethiopica* plants at 3 sites.

A total of 782 fungal isolates were recovered from diseased Z. *aethiopica* plants over all of the 29 sites. The genera most frequently isolated from diseased roots and rhizomes were *Fusarium*, *Pythium*, *Alternaria* and *Rhizoctonia*. The most frequently occurring species identified were *Fusarium solani*, *Fusarium oxysporum* and *Pythium coloratum*. Koch's postulates were fulfilled for *F. solani* and *F. oxysporum*, but have not been tested for other fungi isolated.

The fungi most commonly associated with the 'shot-hole' symptom on Z. *aethiopica* leaves were *Phoma* spp. characterised by a range of pycnidial and pycnidiospore morphologies. However, none of the *Phoma* spp. produced aggregates of the '*Alternaria*-like' chlamydospores which are characteristic of *Phoma zantedeschia*, a species associated with Z. *aethiopica* (3). *Phytophthora richardiae*, an important recorded pathogen of *Z. aethiopica* (4) was not isolated in the present study.

DISCUSSION

Two new pathogen associations with Z. *aethiopica* arising out of this study are *F. solani* and *F. oxysporum*. Also, this is the first record of *Pythium coloratum* on Z. *aethiopica* in the world.

Fusarium oxysporum is known to form host specific pathovars. Host specificity is an important requirement for a pathogen to be suitable for use as a biological control agent. It is primarily for this reason that the *F. oxysporum* isolates show the most potential for the future development of a myco-herbicide against Z. *aethiopica*. Similarly, *Alternaria* spp. are known to form host specific pathovars. Further work needs to be done to determine the pathogenicity of *Alternaria* isolates from the present study toward Z. *aethiopica*. Such pathogenic isolates may then offer an avenue for the development of a mycoherbicide.

It is unfortunate that *P. richardiae* was not isolated in the present study. This is a virulent pathogen of Z. *aethiopica* (4) which if present may have been a promising avenue for the development of a mycoherbicide.

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