maintain the viability of *F. oxysporum* over a time period of at least 12 months at room temperatures (±20°C). Future studies are aiming to further develop the formulations and to test their efficacy under field conditions.

**Stumpout™ - Commercial Production of a Fungal Inoculant to Prevent Regrowth of Cut Wattle Stumps in South Africa**

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Many of the introduced Australian *Acacia* species, including black (*A. mearnsii*) and golden (*A. pycnantha*) wattle, are invasive and have infested large areas in South Africa. In the course of experimental trials, naturally infected dead black wattle stumps were found to be colonized by the basidiomycete *Cylindrobasidium laeve*. Tests were conducted by the PPRI Weed Pathology Unit, Stellenbosch, on the effectiveness of this fungus as a biological control agent of cut wattle stumps. Results of field trials showed mortality of treated stumps of both *A. mearnsii* and *A. pycnantha* to be greater than 80% (reaching 90 and 100% in some cases) within 6-12 months of treatment. The product Stumpout™ was registered in 1997 for use as a fungal inoculant to treat and kill wattle stumps. The limited market for the product has dissuaded large business interest in Stumpout™; however, there is a regular demand for the product from conservation organizations and landowners. To meet this demand, Stumpout™ is produced in a small factory on the premises of PPRI Weed Pathology Unit, Stellenbosch, and distributed to clients on request. Clients receive small sachets of the product, consisting of live basidiospores of the fungus *Cylindrobasidium laeve* in an oil formulation. The product is diluted in sunflower oil and 1-2 ml is painted onto the fresh cut surface of the tree stump. The stumps die within a year of treatment. Currently tests are being carried out in order to determine the efficacy of the product against various other alien weed tree species.

**Release and Colonization of the Bindweed Gall Mite, *Aceria malherbae*: A Field Bindweed Biological Control Program for the Texas High Plains**

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*Aceria malherbae* Nuzzaci is a gall-forming eriophyid mite imported from Greece for biocontrol of field bindweed. The mite injures plants by producing galls on leaves, petioles, stems and roots. Infested plants are yellowed, have deformed leaves, reduced vigor,
and new growth is killed. The mites can kill whole plants, limit seed production and reduce vegetative spread. *A. malherbae* overwinters on the roots of bindweed, and is present in the spring when bindweed growth begins, where it can quickly build up and suppress new growth. After an initial quarantine period at the USDA-ARS Insect Quarantine Facility at Temple, TX, *A. malherbae* was released at Bushland, TX, in 1989. Approximately 5,800 mites were released in May and 9,000 mites were released in June. By June 1992, 52% of the bindweed crowns at the release site were infested with mites and the mites had moved 9.5 m from the release site. By July 1996, mites had spread over one km from the release site and reduced the bindweed infestation by 50%. Mites have spread at a rate of about 0.125 km/yr. In 1998, a program was initiated at the US Department of Energy’s Pantex plant in Amarillo, TX, to redistribute the mite within the confines of this installation. Initial success has been excellent. The release sites in 1998 were inadvertently mowed; however, this “accident” proved to be beneficial. Over a period of 83 days, the mites moved 60-164m (0.73-2m/day) from the point of release at the mowed sites. In contrast, the “natural” movement at the Bushland release site averaged 0.35m/day. In essence, the mites dispersal was increased by 2-6x at the mowed sites. It is thought that since the mites are so small, mite-infested bindweed “clippings” act as good host material for distribution. Releases, redistribution, and monitoring will continue throughout 1999.

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**Desiccation Tolerance in Microbial Herbicides**

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An isolate of *Colletotrichum truncatum* which controls *Sesbania exaltata* and an isolate of *Alternaria alternata* which causes foliar disease on *Amaranthus retroflexus* were selected for a study of the effects of nutrition (C:N ratios of 5:1, 15:1, 40:1) during conidiation on their desiccation tolerance, pathogenicity and conidial ultrastructure. The extracellular matrices (ECMs) produced around germlings were also studied. Conidia of *C. truncatum* grown at C:N of 5:1 showed better desiccation tolerance, higher germination on the host, and more disease expression than those grown at other C:N ratios. Similar effects were found for *A. alternata* conidia grown at C:N of 15:1. ECMs were not visible by either scanning or transmission electron microscopy. However, staining with fluorescent-lectin conjugates and colloidal gold revealed ECMs in both fungi. In the case of *C. truncatum*, concanavalin A (ConA) bound to both ungerminated conidia and germ tubes. Wheat germ agglutinin (WGA) did not label the germ tubes but bound strongly to most appressoria and conidia. Neither soybean agglutinin nor *Ricinus communis* agglutinin reacted with conidia and appressoria but both lectins stained germ tubes. Partial labelling of some appressoria by *Dolichus biflorus* agglutinin was observed. *Ulex europaeus* agglutinin and peanut agglutinin did not label germlings. Colloidal gold staining and silver enhancement revealed the presence of basic proteins around germlings. For *A. alternata*, ConA and WGA strongly labelled the germ tubes, but not conidia. Other lectins showed no reaction with germlings. Colloidal gold staining and silver enhancement showed pro-