

P71 CONTROL OF CITRUS BLACK SPOT (*GUIGNARDIA CITRICARPA*) BY BIOLOGICAL CONTROL AGENTS AND OTHER ALTERNATIVE PRODUCTS

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Citrus black spot (CBS) has been responsible for substantial damage in citrus, in different countries. In Brazil, the disease occurs in several municipalities in the State of São Paulo, in an area that is highly representative of the state's citriculture. Black spot control basically relies on the use of protective or systemic fungicides, applied at 28-day intervals. The objective of this work was to evaluate the effects of biocontrol agents (*Bacillus subtilis* and *Trichoderma* sp.) and other alternative products (cow milk and biofertilizer) to control CBS in organic and conventional systems.

In the first experiment, the following treatments were done: *B. subtilis* (10^7 and 10^8 UFC/ml); autoclaved Milhocina (0.5%) + Molasses (0.5%); *Trichoderma* sp. (10^6 conidia/ml); cow milk (5%) and Microgeo® (commercial biofertilizer currently used by citrus organic growers). All treatments, except Microgeo®, were sprayed at scheduled intervals (0, 28, 56, 84, 112, 140, and 168 days) from December 8, 2004 (bloom period) to August 28, 2005 (fruit harvest). The Microgeo® treatment was sprayed along all year at a monthly interval. The experiment was conducted in a completely randomized blocks design with 5 treatments and 15 replication plants ('Pera'). The severity of the disease on 50 fruits at harvest stage collected randomly from each replication plant were evaluated by means of a six-category scale, where 1=0.5%, and 6=49% of fruit area with lesions. The percentage of fruits classified at class 1, 2 and 3 to 6 were calculated. The milk and *B. subtilis* (10^8) treatments did not differ significantly from each other and presented the higher percentage of fruits classified at class 1 (26.3% and 19.4%, respectively) and the lower percentage of fruits at class 3 to 6 (29.9% and 35.6%, respectively). The milk and *B. subtilis* treatments were significantly superior to Microgel® treatment (10.9% e 50.8%, respectively for fruits at class 1, 2 and 3 to 6).

In the second experiment, in a 'Valência', on conventional system orchard, different doses (0, 2.5, 5, 7.5, and 10% v/v) of a biofertilizer (produced by aerobic fermentation of a mixture of molasses, compost cattle manure, earthworm humus, yeast and water) were sprayed at the same dates as the first experiment and compared with a standard fungicide treatment. The % of fruits classified as 1 and 2 were 4.4, 8.0, 5.8, 6.6, 4.9 and 12.8, respectively for the treatments 0, 2.5, 5.0, 7.5 and 10% of biofertilizer and fungicide. The percentage of fruits classified as 5 and 6, for the same treatments were 38.4, 29.5, 27.8, 28.4, 28.0, and 19.4. The results show the potential of biofertilizer, milk and *B. subtilis* as an alternative for citrus black spot control, especially in organic agriculture.



**International Organisation for Biological and Integrated
Control of Noxious Animals and Plants (IOBC)**

West Palaearctic Regional Section (WPRS)

Organisation Internationale de Lutte Biologique et Intégrée contre les Animaux et les Plantes Nuisibles (OILB)
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Proof of participation at the IOBC/wprs Workshop "Fundamental and practical approaches to increase biocontrol efficacy"
Spa, Belgium, September 6-10, 2006

To whom it may concern

This is to certify that Bettiol Wagner actively participated at the IOBC workshop, held on September 6-10, 2006 in Spa, Belgium.

At the workshop, Bettiol Wagner presented a poster/oral presentation with the following title: *Control of Citrus black spot (Guignardia citricarpa) by biological control agents and other alternative products*

In view of his/her active contribution to the programme, his/her presence at the IOBC workshop was highly appreciated.

Yours sincerely,

Prof. Monica Höfte
Local organizer IOBC workshop