Hemiberlesia pitysophila **System:** Terrestrial

Kingdom	Phylum	Class	Order	Family
Animalia	Arthropoda	Insecta	Homoptera	Diaspidae

Common name pine armoured scale (English), pine needle hemiberlesian scale (English), pine-needle scale insect (English), pine greedy scale (English)

Synonym

Similar species

Summary Hemiberlesia pitysophila (pine-needle scale insect) is a damaging pest of pine tree plantations, especially when introduced in the absence of natural enemies.

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Species Description
The scale cover of adult female the pine-needle scale insect (*Hemiberlesia pitysophila*) in life is oval, convex, dirty white to mid-brown, with buff to red-brown submarginal exuviae that may be paler or darker than the secreted scale. The scale cover of male has not been documented (Watson Undated).

Habitat Description
The pine-needle scale insect (*Hemiberlesia pitysophila*) has been recorded from the needles of trees belonging to the plant family Pinaceae, genus *Pinus* (Takagi 1969, Tao 1999, in Watson Undated). Hosts include: *Pinus elliotii*, *P. massoniana* and *P. thunbergii* (Watson Undated). Pan and colleagues (1989) found that *H. pitysophila* had 5 overlapping generations/year in China. Temperature was the main factor influencing the population growth and forest decline, and pest mortality increased when the temperature was above 23°C or lower than 18°C. Dense stands favoured the incidence and development of the pest (Watson Undated). In China, Tong and colleagues (1988) found that air temperature was the main influence on population size, with 19.5°C averaged over 10 days being the optimum for the growth and development of the insect, but monthly precipitation over 100mm was detrimental to reproduction (Watson Undated).

General Impacts
The pine-needle scale insect (*Hemiberlesia pitysophila*) is a damaging pest of pine tree plantations, especially when introduced in the absence of natural enemies (Watson Undated). Plants are affected in the following stages: vegetative growing, flowering and fruiting stages and plant parts affected are the needles (Watson Undated). Heavy infestations of *H. pitysophila* can kill pine trees (Watson Undated).

Management Info
Preventative measures: Detection and inspection methods: Examine needles of the hosts listed above, for oval, convex, dirty white to mid-brown scale covers, each with buff to red-brown submarginal exuviae that may be paler or darker than the secreted part of the scale. Microscopic examination of slide-mounted adult females is required for authoritative identification to species (Watson Undated). International Quarantine: Planting material of *Pinus* species should not be transported from China or Japan (where this species is a known pest) to other countries without thorough phytosanitary precautions.
Chemical: Studies on chemical control of the pine armoured scale seriously infests pine trees were conducted during 1988 and 1989 in Guangdong Province, China. Oil emulsion, formulated by mixing rubber tree seed oil (or chinaberry seed oil) with the diesel oil at a ratio of 3:7 (with an emulsifier) was highly effective. Ground spray application showed that at concentration of 5% the product gave a control of up to 90-100%. In aerial spray application it was shown that this mixture when diluted with water at 1:4 equivalent to 75kg/ha gave a control efficiency above 70%, more potent than the conventional pine resin-diesel oil mixture commonly used in Hui-Ding County, Guangdong Province and other places. The product was safe for *Encarsia* sp. and *Aphytis* sp., hymenopterous parasites as the most important natural enemies of the pine armoured scale and proved to have no harmful effect on the environment. Furthermore, the formulation can be easily prepared as an emulsion. It is suggested that the product could be widely used for the effective control of the pine armoured scale and other insects infesting the pine trees (Chiu *et al*. 1993).
Results of field experiments conducted in Luoyang, China, to study the control effects of 6 compound pesticides on *H. pitysophila* in a forest environment, showed that all the tested pesticides were effective in controlling the scale. Applied singularly, chlorpyrifos mixed with methidathion at a ratio of 11:25 had a satisfactory control effect and a continuous effect at the concentration of 400-800 in a forest environment. Chlorpyrifos mixed with buprofezin at the ratio of 11:20, at the concentration of 400-800, and acetamiprid mixed with imidacloprid at the ratio of 1:1 at the concentration 1:3000 had relatively high control effect (English summary Hu *et al*. 2006).
Biological: Natural enemies of *Hemiberlesia pitysophila* are as follows: parasitoids - *Coccobius azumai* (attacks adult females in Japan (Okinawa) and introduced in China (Guangdong)), *Encarsia amicula* (China), *E. citrina* (China), *Marietta carnesi* (China); predators - *Anystis baccarum* (China); pathogens - *Cladosporium cladosporioides* (China) (Watson Undated). *Cladosporium cladosporioides*, isolated from a species of *Kermes*, was used to control *H. pitysophila*. The results showed that the mortality rate of the insects induced by the fungus was up to 38.9% on an average in laboratory tests, and 20-57% in field tests (Pan *et al*. 1989). In a survey in 15 counties of Guangdong Province, China, 12 species of parasitoid wasps of the diaspidid *H. pitysophila* were found. Of these, *Encarsia citrina*, *E. amicula* and *Marietta carnesi* were the most widely distributed and *Encarsia* spp. were the most numerous. The parasitoid complex has been unable to control the diaspidid effectively, as the rates of parasitism are low (Liang and Chen 1990).

Pathway
Dispersal of sessile adults and eggs occurs through human transport of infested plant material (Watson Undated).

Principal source:

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Review: Expert review underway

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ALIEN RANGE

[4] CHINA
[3] JAPAN
[1] HONG KONG
[1] MACAO

[1] TAIWAN

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