Quadrastichus erythrinae **System:** Terrestrial

Kingdom	Phylum	Class	Order	Family
Animalia	Arthropoda	Insecta	Hymenoptera	Eulophidae

Common name erythrina gall wasp (EGW) (English), erythrina gall wasp (English)

Synonym

Similar species

Summary Unusual growths, caused by the Erythrina gall wasp (Quadrastichus erythrinae), on leaves and young shoots of coral trees (Erythrina spp). alerts to the presence of this emerging invasive species. Q. erythrinae measures a mere 1.5mm and may be spread easily via infected leaves from infected Erythrina specimens.

view this species on IUCN Red List

Species Description
Female: Length 1.45–1.6 mm. Dark brown with yellow markings. Head yellow, except gena posteriorly brown. Antenna pale brown except scape posteriorly pale. Pronotum dark brown. The mid lobe of mesoscutum with a ‘‘V’’ shaped or inverted triangular dark brown area from anterior margin, the remainder yellow. Scapula yellow. Scutellum, axilla and dorsellum brown to light brown. Propodeum dark brown. Gaster brown. Fore and hind coxae brown. Mid coxa almost pale. Femora mostly brown to light brown. Specimens from Mauritius are generally darker than those from Singapore. Oviposter sheath not protruding, short in dorsal view (Kim Delvare and La Salle 2004).
Male. Length 1.0–1.15 mm. Pale coloration white to pale yellow as opposed to yellow in female. Head and antenna pale. Pronotum dark brown (but in lateral view, only upper half dark brown; lower half yellow to white). Scutellum and dorsellum pale brown. Axilla pale. Propodeum dark brown. Gaster in anterior half pale; remainder dark brown. Legs all pale. Antenna with 4 funicular segments; without the whorl of setae; F1 distinctly shorter than the other segments and slightly transverse; about 1.4 wider than long. Ventral plaque extending 0.4– 0.5 length of scape and placed in apical half. Gaster shorter than female. Genitalia elongate, with digitus about 0.4 length of the long, exserted aedagus (Kim Delvare and La Salle 2004).

Lifecycle Stages
Studies conducted by the Hawai'i Department of Agriculture (HDOA) on Erythrina gall wasp indicate a life cycle (egg to adult) of about 20 days. A one-day old female wasp contains about 60 mature eggs in its ovaries. The adult female wasp exhibited a preference for depositing eggs in very young terminal leaves and stems, but not mature leaves. Adult wasps not given any food survived less than 3 days (males - 2.5 days, females - 2.9 days) while those provided with honey lived longer (males - 10.3 days, females - 6.1 days). The sex ratio of emerging wasps in lab-infested plants was 7 males to 1 female (Heu *et al*. 2006).

Habitat Description
The Erythrina gall wasp infests Erythrina species, of which there are approximately 110 in tropical regions around the world. Erythrina are used as ornamentals, ‘living fences’, and nitrogen-fixing components of agroforestry systems.

Reproduction
A single female Erythrina gall wasp carries on average approximately 320 eggs (Yang *et al*. 2004).

General Impacts
Like other gall-forming eulophid wasps, the Erythrina gall wasp inserts its eggs inside young leaf and stem tissue. The wasp larvae, which develop within plant tissue, induce the formation of galls in the leaflets and petioles. As the infestation progresses, leaves curl and appear deformed while petioles and shoots become swollen. After feeding is complete, larvae pupate within the leaf and stem tissue. After pupation within the galls, adult wasps emerge after cutting exit holes through to the outside. Heavily galled leaves and stems result in a loss of growth and vigour. Severe infestations can cause defoliation and death of trees (Yang *et al*. 2004; Heu *et al*. 2006).
The Erythrina gall wasp infests *Erythrina* spp. of which there are approximately 110 mostly in tropical regions around the world. (Kim *et al*. 2004). *Erythrina* spp. are also known as coral trees and have a variety of functions in different locations. In Taiwan they are highly associated with farming and fishing activities (Yang *et al*. 2004). As indicated by its Latin name \"*erythros*\" meaning red, its obvious red flowers have been used as a sign of the arrival of spring and as a working calendar by tribal peoples (Yang *et al*. 2004). Specifically, the blooming of its showy red flowers serves as a signal to the coastal people to begin their ceremonies for catching flying fish, and for the Puyama people to plant sweet potatoes (Yang *et al*. 2004).
In Hawai'i the Erythrina gall wasp infests coral trees, *Erythrina variegata*, *E. crista-galli* and the native *E. sandwicensis* (Heu *et al*. 2006). *E. sandwicensis*, known as the *wiliwili* tree, is endemic to Hawai'i and a "keystone species in Hawai'i's lowland dry forest, one of the most endangered ecosystems in the world." For a closer look at the threat posed by the Erythrina gall wasp to the native Hawai'i *wiliwili*, please see *Wiliwili* on Maui: threatened by the Erythrina gall wasp . Control of the spread of Erythrina gall wasp in Hawai'i was predicted to cost over $1 million in 2008 (Brannon, 2007).
The Erythrina gall wasp has caused approximately 95% mortality of *Erythrina* endemic to Hawai'i (*E. sandwicensis* and *E. variegate*) over 2 years (Medeiros, 2008, personal communication, 28 Nov). The Erythrina gall wasp, although thought to be native to Africa (Gates & Delvare, 2008), has been identified as a threat to *Erythrina* trees in Latin America, Asia, Africa, and Oceania (including the Pacific) (Messing, 2008; Li *et al.* 2006).

Management Info
Section being updated

Pathway
Boats carrying fallen infested leaves raise the risk of spreading Erythrina gall wasp (*Quadrastichus erythrinae*) (SPC 2006).

Principal source:

Compiler: Major update underway: IUCN/SSC Invasive Species Specialist Group (ISSG)

Review: Gene-Sheng Tung Forest Protection Division, Taiwan Forestry Research Institute, Taipei, Taiwan, ROC

Pubblication date: 2010-02-26

ALIEN RANGE

[1] AMERICAN SAMOA
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[1] INDIA
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[2] MAURITIUS
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[1] THAILAND
[9] UNITED STATES
[1] VIET NAM
[1] REUNION
[1] SINGAPORE
[1] TAIWAN
[1] TONGA
[1] VANUATU

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Hawaiian Ecosystems at Risk Project (HEAR), 2006. Species Info *Quadrastichus erythrinae* (Eulophidae)

Summary: The mission of the Hawaiian Ecosystems at Risk project (HEAR) is to provide technology, methods, and information to decision-makers, resource managers, and the general public to help support effective science-based management of harmful non-native species in Hawaii and the Pacific. HEAR is available from http://www.hear.org/

This page is available from: http://www.hear.org/species/quadrastichus_erythrinae/

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Summary: PaDIL (Pests and Diseases Image Library) is a Commonwealth Government initiative, developed and built by Museum Victoria s Online Publishing Team, with support provided by DAFF (Department of Agriculture, Fisheries and Forestry) and PHA (Plant Health Australia), a non-profit public company. Project partners also include Museum Victoria, the Western Australian Department of Agriculture and the Queensland University of Technology.

The aim of the project is: 1) Production of high quality images showing primarily exotic targeted organisms of plant health concern to Australia. 2)Assist with plant health diagnostics in all areas, from initial to high level. 3) Capacity building for diagnostics in plant health, including linkage developments between training and research organisations. 4)Create and use educational tools for training undergraduates/postgraduates. 5) Engender public awareness about plant health concerns in Australia. PaDIL is available from : http://www.padil.gov.au/aboutOverview.aspx, this page is available from: http://www.padil.gov.au/viewPestDiagnosticImages.aspx?id=989 [Accessed 10 November 2007]

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