

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. variegata*) 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

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ALIEN RANGE

[1] AMERICAN SAMOA

[2] FIJI

[1] HONG KONG

[1] JAPAN

[1] MALDIVES

[1] MICRONESIA, FEDERATED STATES OF

[1] CHINA

[1] GUAM

[1] INDIA

[1] MALAYSIA

[2] MAURITIUS

[1] NEW CALEDONIA

[1] PHILIPPINES
[3] SAMOA
[1] SOUTH AFRICA
[1] THAILAND
[9] UNITED STATES
[1] VIET NAM

[1] REUNION
[1] SINGAPORE
[1] TAIWAN
[1] TONGA
[1] VANUATU

BIBLIOGRAPHY

29 references found for *Quadrastichus erythrinae*

Management information

[Docola, Joseph J.; Smith, Sheri L.; Strom, Brian L.; Medeiros, Arthur C.; von Allmen, Erica., 2009. Systemically Applied Insecticides for Treatment of Erythrina Gall Wasp, *Quadrastichus erythrinae* Kim \(Hymenoptera: Eulophidae\) *Arboriculture & Urban Forestry*. 35\(4\). JUL 2009. 173-181.](#)

Summary: Available from: http://www.srs.fs.usda.gov/pubs/ja/ja_docola001.pdf [Accessed 12 May 2010]

Fischer, J. B.; Strom, B. L.; Smith, S. L., 2009. Evaluation of a commercially available ELISA kit for quantifying imidacloprid residues in *Erythrina sandwicensis* leaves for management of the Erythrina gall wasp, *Quadrastichus erythrinae* Kim. *Pan-Pacific Entomologist*. 85(2). APR 2009. 99-103.

Gates, M. & Delvare, G. 2008. A new species of *Eurytoma* (Hymenoptera: Eurytomidae) attacking *Quadrastichus* spp. (Hymenoptera: Eulophidae) galling *Erythrina* spp. (Fabaceae), with a summary of African *Eurytoma* biology and species checklist. *Zootaxa* 1751: 1-24.

[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/

Heu, R.A., Tsuda, D.M., Nagamine, W.T., Yalamar, J.A. and Suh, T.H. 2006. Erythrina gall wasp *Quadrastichus erythrinae* Kim (Hymenoptera: Eulophidae), New Pest Advisory. Department of Agriculture: Manoa (Hawaii).

Kanai, Kenichi; Matsuhira, Kunihiro; Uechi, Nami; Yukawa, Junichi, 2008. Invasion of the Amami Islands, Kagoshima, Japan by *Quadrastichus erythrinae* (Hymenoptera: Eulophidae) *Japanese Journal of Applied Entomology & Zoology*. 52(3). 2008. 151-154.

[Li, H.M., Hui Xiao, Hu Peng, Hong-xiang Han and Da-yong Xue, 2006. Potential global range expansion of a new invasive species, the Erythrina gall wasp, *Quadrastichus erythrinae* Kim \(insecta: Hymenoptera: Eulophidae\). *Raffles Bulletin of Zoology* 54 \(2\): pp. 229-234.](#)

Summary: Available from: <http://www.bio-nica.info/biblioteca/Li2006InvasiveSpecies.pdf> [Accessed 2 August 2010]

Rubinoff, Daniel; Holland, Brenden S.; Shibata, Alexandra; Messing, Russell H.; Wright, Mark G., 2010. Rapid Invasion Despite Lack of Genetic Variation in the Erythrina Gall Wasp (*Quadrastichus erythrinae* Kim). *Pacific Science*. 64(1). JAN 2010. 23-31.

[Secretariat of the Pacific Community \(SPC\), 2006. Erythrina Gall Wasp \(*Quadrastichus erythrinae*\), in American Samoa. 2006. Pest Alert. Plant Protection Service, Secretariat of the Pacific Community.](#)

Summary: English language version available from: http://www.spc.int/pps/PestAlerts/PestAlertNo35_EGwasp.pdf; French language version: http://www.spc.int/pps/PestAlerts/PestAlertNo35_EGwasp_French.pdf [Accessed 2 August 2010]

Secretariat of the Pacific Community (SPC) Pest Focus - February 2006 Erythrina gall wasp (*Quadrastichus erythrinae*)

[Tanji, E. \(2008, November 29\). Insects being released to attack gall wasps. *The Maui News* \[online\] accessed 06/01/2009\].](#)

[Walker, K. 2007. Erythrina gall wasp \(*Quadrastichus erythrinae*\) Pest and Diseases Image Library.](#)

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]

Wang Yan-Ping; Wen Jun-Bao, 2006. Potential risk assessment of a new invasive pest, *Quadrastichus erythrinae*, to the mainland of China . *Chinese Bulletin of Entomology*. 43(3). MAY 2006. 364-367.

[Wiley, J. & Skelley, P. 2006. Erythrina Gall Wasp, *Quadrastichus erythrinae* Kim, in Florida Pest Alert. Florida Department of Agriculture and Consumer Services. Division of Plant Industry](#)

Summary: Available from: <http://www.doacs.state.fl.us/pi/enpp/ento/gallwasp.html> [Accessed 2 May 2008]

Xu, T., Christopher M. Jacobsen, Arnold H. Hara, Ji Lia and Qing X Lic, 2008. Efficacy of systemic insecticides on the gall wasp *Quadrastichus erythrinae* in wiliwili trees (*Erythrina* spp.). *Pest Management Science* 65(2): pp. 163 - 169.

General information

[Brannon, J. \(2007, March 23\). Dying trees cost \\$1M a year. *The Honolulu Advertiser* \[online\] accessed 07/01/2009\].](#)

[Faizal, M. H.; K. D. Prathapan; K. N. Anith; C. A. Mary; M. Lekha; C. R. Rini, 2006. Erythrina gall wasp *Quadrastichus erythrinae*, yet another invasive pest new to India. *Current Science*, VOL. 90, NO. 8, 25 APRIL 2006](#)

Summary: Available from: <http://www.ias.ac.in/currsci/apr252006/1061.pdf> [Accessed 12 May 2010]

Gerlach, J.; Madl, M., 2007. Notes on *Erythrina variegata* (LINNAEUS 1754) (Rosopsida : Fabaceae) and *Quadrastichus erythrinae* kim 2004 (Hymenoptera : chalcidoidea : Eulophidae) in Seychelles. *Linzer Biologische Beitrage*. 39(1). JUL 2007. 79-82.



GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: *Quadrastichus erythrinae*

- Hurley, T. 2005. Tiny wasp may kill off native trees, *Hawaii Advertiser*.
- Jiao Yi; Chen Zhi-lin; Yu Dao-jian; Kang Lin; Yang Wei-dong, 2006. A new record genus and new record species of Eulophidae (Hymenoptera) in continental China. *Entomotaxonomia*. 28(1). MAR 2006. 69-74.
- Jiao Yi; Chen Zhi-Lin; Yu Dao-Jian; Kang Lin; Yang Wei-Dong; Chen Zhi-Nan; Chen Xiao-Ying, 2007. Bionomics of the erythrina gall wasp, *Quadrastichus erythrinae* Kim (Hymenoptera : Eulophidae) *Acta Entomologica Sinica*. 50(1). JAN 20 2007. 46-50.
- [Kaya, T. \(2007, June 18\). Wasp swap: A relief for wiliwili? *The Maui News* \[online\] accessed 06/01/2009.](#)
- Kim, I., Delvare, G. and La Salle, J. 2004. A new Species of *Quadrastichus* (Hymenoptera: Eulophidae): A Gall-Inducing Pest on *Erythrina* (Fabaceae), *J. HYM. RES.* 13(2): 243-249.
- Kore, Basavaraj, 2006. Erythrina gall wasp *Quadrastichus erythrinae*. *Current Science* (Bangalore). 91(1). JUL 10 2006. 8.
- Messing, R. H., Sandra Noser and Josef Hunkeler, 2008. Using host plant relationships to help determine origins of the invasive Erythrina gall wasp, *Quadrastichus erythrinae* Kim (Hymenoptera: Eulophidae). *Biological Invasions*. Volume 11, Number 10 / December, 2009
- Rubinoff, Daniel; Brenden S. Holland; Alexandra Shibata; Russell H. Messing, and Mark G. Wright, 2010. Rapid Invasion Despite Lack of Genetic Variation in the Erythrina Gall Wasp (*Quadrastichus erythrinae* Kim). *Pacific Science* (2010), vol. 64, no. 1:23-31
- [Thomas, P. \(2005\). Wiliwili on Maui: threatened by the Erythrina gall wasp \[online - accessed 07/01/2009\]](#)
- Uechi, Nami; Takumi Uesato and Junichi Yukawa, 2007. Detection of an invasive gall-inducing pest, *Quadrastichus erythrinae* (Hymenoptera: Eulophidae), causing damage to *Erythrina variegata* L. (Fabaceae) in Okinawa Prefecture, Japan *Entomological Science* (2007) 10, 209-212
- [Yang, M., Tung, G., La Salle, J. and Wu, M. 2004. Outbreak of erythrina gall wasp \(Hymenoptera: Eulophidae\) on *Erythrina* spp. \(Fabaceae\) in Taiwan.](#)
- Summary:** Available from: <http://www.pps.org.tw/pdf/ppb46-4-8.pdf> [Accessed 2 August 2010]