The Invasive Gall Wasp *Quadrastichus erythrinae* Kim in Mexico

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La Invasiva Avispa Agalladora *Quadrastichus erythrinae*[1] Kim en México

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Abstract. We report for the first time the presence of the erythrina gall wasp *Quadrastichus erythrinae* Kim in Mexico.

Resumen. Se reporta por primera vez, la presencia de la avispa agalladora de la eritrina *Quadrastichus erythrinae* Kim en México.

Quadrastichus erythrinae Kim is a recently discovered phytophagous hymenopteran attacking petioles and leaves of *Erythrina fusca* Lour. and *E. indica* Lam. trees in Singapore, Mauritius, and Réunion (Kim et al. 2004). The insect has gradually dispersed to countries of Africa, America, Asia, and Oceania. In Africa, it was reported in Mauritius, Réunion (Kim et al. 2004), Seychelles (EPPO 2017), South Africa (Global Invasive Species Database 2017), and Tanzania (EPPO 2017). In America, it was reported in Florida and Hawaii in the United States (EPPO 2017); Guadeloupe, Martinique (Etienne and Dumbardon 2013), and Puerto Rico (Jenkins et al. 2014) in the Caribbean; and in Brazil in South America (Culik et al. 2014). In Asia, it is present in China (Fujian, Guangdong, Hainan, Xianggang, Aomen (Macao)) (EPPO 2017), India (Karnataka, Kerala, Maharashtra, West Bengal) (EPPO 2017), Japan (Ryukyu Archipelago and Okinawa) (Uechi et al. 2007, EPPO 2017), Malaysia (EPPO 2017), Maldives (Global Invasive Species Database 2017), Philippines (EPPO 2017), Singapore (Kim et al. 2004), Sri Lanka (EPPO 2017), Taiwan (Yang et al. 2004), Thailand (EPPO 2017), and Vietnam (EPPO 2017); and in American Samoa (EPPO 2017), Fiji (Global Invasive Species Database 2017), Guam (EPPO 2017), Micronesia, New Caledonia, Tonga, and Vanuatu (Global Invasive Species Database 2017) in Oceania. Recently in the northern part of the Mexican state of Oaxaca, damage was observed on petioles and leaves of two *Erythrina variegata* L. trees. The goal of the study was to identify the insect that caused such damage.

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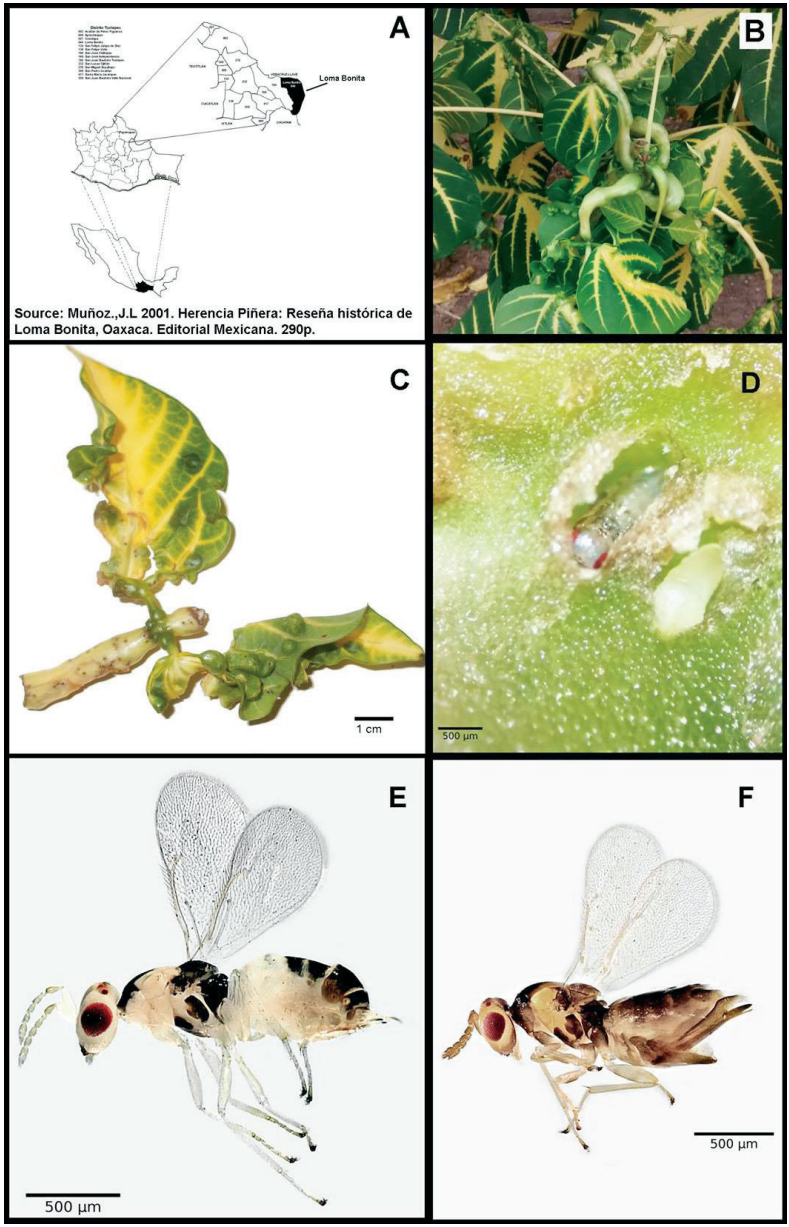

Fig. 1. Location of the state of Oaxaca and Loma Bonita (A), leaves and petioles with galls on *E. variegata* L. (B and C), larva and pupa (D), male (E), and female of the erythrina gall wasp *Q. erythrinae* (F).

Fig. 1. Ubicación del estado de Oaxaca y Loma Bonita (A), hojas y peciolos de *E. variegata* L. con presencia de agallas (B y C), larva y pupa (D), macho (E), y hembra de la avispa agalladora de la eritrina *Q. erythrinae* (F).

In January 2017, two ornamental trees of *Erythrina variegata* L. with galls on petioles and leaves were observed and monitored in Loma Bonita, Oaxaca (Fig. 1A), (1). N 18°06 '18.3" W 0.95°52'39.0", 27 m above sea level; (2). N 18°06 '22.3" W 0.95°53'17.7", 25 m above sea level. Plant petioles and leaves with damage (Fig. 1B,C) were taken to the Chemical-Biological Laboratory of the Papaloapan University, Loma Bonita campus for analysis. The gall interior was observed in detail, where larvae and pupae of the erythrina gall wasp were found (Fig. 1D). The emerged adult insects were sent for identification to the entomology area of the Forest Health Analysis and Reference Laboratory (SEMARNAT, *Secretaría del Medio Ambiente y Recursos Naturales*). The plant material was determined by plant taxonomy specialists Heike Vibrans and Ricardo Muñoz of the botany graduate program of the Postgraduate College of Texcoco in the State of Mexico. The insects were deposited in the COLARSF (*Colección del Laboratorio de Análisis y Referencia en Sanidad Forestal*) of the SEMARNAT at Mexico City, and plant material in the Herbarium of the Colegio de Postgraduados at Texcoco.

The species in the petiole and leaf galls of *E. variegata* L. trees was identified as *Quadrastichus erythrinae*, being the first record of the insect in Mexico (Fig. 1E,F). The collection area was in southeastern Mexico with tropical climate. Li et al. (2006) predicted potential distribution of *Q. erythrinae* in Mexico, which is accepted with this record. In different places throughout the world the species has been collected attacking several species of the *Erythrina* genus (Kim et al. 2004, Yang et al. 2004, Howard et al. 2008, Doccola et al. 2009, Étienne and Dumbardon 2013). The presence of the pest in the northern part of the State of Oaxaca can threaten other species of the *Erythrina* genus in Mexico. Based on the new record, knowledge of its host plants, and potential distribution of *Q. erythrinae* suggested by Li et al. (2006), *E. herbacea* species would also be prone to attack because of its distribution in bordering zones such as the municipality of Tuxtepec, Oaxaca (Sousa et al. 2004). Potential spread of *Q. erythrinae* in Mexico and other countries of America is eminent, because as indicated by Neill in 1988 the greatest diversity of species of the genus of legumes is in southeastern Mexican and Central America.

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References Cited

Culik, M. P, D. dos Santos M., J. Aires V., and V. A. Costa. 2014. The invasive gall wasp *Quadrastichus erythrinae* (Hymenoptera: Eulophidae) in South America: is classical biological control needed? Bio Sci Tec. 24: 971-975.

Doccola, J. J., S. L. Smith., B. L. Strom., A. C. Medeiros, and E. von Allmen. 2009. Systemically applied insecticides for treatment of Erythrina gall wasp, *Quadrastichus erythrinae* Kim (Hymenoptera: Eulophidae). Arboriculture & Urban Forestry 35: 173-181.

EPPO. 2017. PQR database. Paris, France: European and Mediterranean Plant Protection Organization. Consultado en línea el 20 Marzo 2017. Disponible en http://www.eppo.int/DATABASES/pqr/pqr.htm.

Étienne, J., and E. Dumbardon M. 2013. *Quadrastichus erythrinae* Kim: un redoubtable ravageur pour les érythrines de Guadeloupe et de Martinique (Hymenoptera, Eulophidae, Tetrastichinae). Bull Soc Entomol Fr. 118: 155-158.

Global Invasive Species Database. 2017. Species profile: *Quadrastichus erythrinae*. Consultado en línea el 20 Marzo 2017. Disponible en http://www.iucngisd.org/gisd/speciesname/Quadrastichus+erythrinae

Howard, F. W., R. W. Pemberton, and H. Liu. 2008. Erythrina gall wasp, *Quadrastichus erythrinae* (Hymenoptera: Eulophidae) in Florida, and susceptibility of *Erythrina herbacea* (Fabaceae). Proc. Fla. State Hort. Soc. 121: 363-369.

Jenkins, D. A., R. F., Mizel. I, III. Van Bloem S., S. Whitmire, L. Wiscovitch, C. Zaleski, and R. Goenaga. 2014. An analysis of arthropod interceptions by APHIS-PPQ and customs and border protection in Puerto Rico. Am Entomol. 60: 44-55.

Kim, I. K., G. Delvare, and J. La Salle. 2004. A new species of *Quadrastichus* (Hymenoptera: Eulophidae): a gall-inducing pest on *Erythrina* (Fabaceae). J. Hym. Res. 13: 243-249.

Li, H. M., H. Xiao., H. Peng., H. Han, and D. Xue. 2006. Potential global range expansion of a new invasive species, the Erythrina gallwasp, *Quadrastichus erythrinae* Kim (Insecta: Hymenoptera: Eulophidae). Raff Bull. Zool. 54: 229-234.

Neill, D. A. 1988. Experimental studies on species relationships in *Erythrina* (Leguminosae: Papilionoidae). Ann. Mo. Bot. 75: 886-969.

Sousa S., M., R. Medina L., G. Andrade M, y M. L. Rico A. 2004. Leguminosas, pp. 249-269. *En* A. J. García-Mendoza, M. J. Ordoñez, y M. Briones-Salas [eds.], Biodiversidad de Oaxaca. Instituto de Biología, UNAM-Fondo Oaxaqueño para la Conservación de la Naturaleza-World Wildlife Fund, México.

Uechi, N., T. Uesato, and J. Yukawa. 2007. Detection of an invasive gall-inducing pest, *Quadrastichus erythrinae* (Hymenoptera: Eulophidae), causing damage to *Erythrina variegate* L. (Fabaceae) in Okinawa Prefecture, Japan. Entomol Sci. 10: 209-212.

Yang, M. M., G. S. Tung., J. La Salle, and M. L. Wu. 2004. Outbreak of Erythrina gall wasp (Hymenoptera: Eulophidae) on *Erythrina* spp. (Fabaceae) in Taiwan. Plant Protect. Bull. 46: 391-396.