



## An illustrated key to the species of subgenus *Gyrostoma* Kirby, 1828 (Hymenoptera, Vespidae, Polistinae) from China, with discovery of *Polistes (Gyrostoma) tenuispunctia* Kim, 2001

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### Abstract

The Chinese species of the subgenus *Gyrostoma* Kirby, 1828 of the polistine genus *Polistes* are reviewed. An illustrated key to the seven species of the subgenus known from China is given. New synonymy are proposed for *Polistes rothneyi* Cameron, 1900 = *P. rothneyi grahami* van der Vecht, 1968, **syn. nov.**; = *P. r. hainanensis* van der Vecht, 1968, **syn. nov.**; = *P. r. iwatai* van der Vecht, 1968, **syn. nov.**; = *P. r. gressitti* van der Vecht, 1968, **syn. nov.**; = *P. r. tibetanus* van der Vecht, 1968, **syn. nov.**; = *P. r. yayeyamae* Matsumura, 1908, **syn. nov.**; = *P. r. koreanus* van der Vecht, 1968, **syn. nov.**; = *P. r. sikkimensis* van der Vecht, 1968, **syn. nov.**. *P. (Gyrostoma) tenuispunctia* Kim, 2001 is newly recorded from China. Its nest is described for the first time. Compared with the sympatric and similar species *P. rothneyi f. grahami* the nest is concealed in a hollow space instead of having the nest directly exposed under an eave as in *P. rothneyi*. The differences in nest architecture are briefly discussed.

**Key words:** Nest architecture, illustrated key, *Polistes*, *Gyrostoma*, new record

### Introduction

*Polistes* Latreille, 1802 is the only cosmopolitan genus of the three subfamilies of social wasps: Stenogastrinae, Polistinae and Vespinae (Carpenter 1996b). *Polistes* is often the most common paper wasp genus with nests near human habitation, where they may be a problem. Although generally not aggressive, they can be provoked into defending their nests. Most species of this genus are predatory, feeding on other insects (especially caterpillars) and may be considered beneficial. Their nests are petiolate and single-combed without envelope. The relatively small colonies are readily observed and manipulated, therefore, *Polistes* nests represent a unique system to study kin selection, and important in understanding the evolution of sociality. The key characters of this genus are as follows: the clypeus gradually tapering into a tooth apically; the first metasomal segment subpetiolate, shorter than the second segment; the muscle slit of the propodeum long and narrow; subdiscoideus of the fore wing joins postnervulus at or close to middle of the vein.

*Polistes* is a speciose genus within the family Vespidae with 221 species and 96 subspecies. However, the species are notorious for morphological and behavioural uniformity, compared with other social wasps (Carpenter 1996a). There still have some cases that the proper status of subspecific taxa cannot be determined for lacking careful study on a case by case basis (Carpenter 1996b). Following the cladistic reclassification by Carpenter (1996a), the genus is divided into four subgenera: *Gyrostoma* Kirby, 1828 (21 species and 30 subspecies), *Polistella* Ashmead, 1904 (84 species and 33 subspecies), *Polistes* Latreille, 1802 (23 species and 6 subspecies), distributed in the Old World (except a few species being accidentally introduced into the New World), and *Aphanilopterus*

## References

- Ashmead, W.H. (1904) Descriptions of new genera and species of Hymenoptera from the Philippine Islands. *Proceedings of the United States National Museum*, 28 (1387), 127–158.
- Arens, W. (2011) Die sozialen Faltenwespen der Peloponnes (Hymenoptera: Vespidae: Vespinae, Polistinae), mit Beschreibung einer neuen *Polistes*-Art und einem regionalen *Polistes*-Bestimmungsschlüsse. *Linzer biologische Beiträge*, 43 (1), 443–481.
- Barthélémy, C. (2008) Provisional Guide to the Social Vespids of Hong Kong (Hymenoptera: Vespidae). Online PDF. Available from: <http://insectahk.com> (accessed 24 March 2014)
- Bequaert, J. (1934) Les races de coloration de *Vespa luctuosa* de Saussure et de *Polistes tenebricosus* Lapeletier. *Bulletin du Musée Royal d'Histoire Naturelle de Belgique*, 10, 1–11.
- Bequaert, J. (1940) Notes on Oriental *Polistes* wasps (Hymenoptera: Vespidae). *Transactions of the American Entomological Society*, 66, 265–272.
- Cameron, P. (1900) Descriptions of new genera and species of Hymenoptera. *Annals and Magazine of Natural History*, 6, 410–419, 495–506, 530–539.
- Cameron, P. (1905) On the Malay fossorial Hymenoptera and Vespidae of the Museum of the R. Zool. Soc. “Natura Artis Magistra” at Amsterdam. *Tijdschrift voor Entomologie*, 48, 48–78.
- Carpenter, J.M. (1996a) Phylogeny and biogeography of *Polistes*. In: Turillazzi, S & West-Eberhard, M.J. (Eds.), *Natural History and Evolution of Paper-Wasps*. Oxford University Press, Oxford, pp. 18–57.
- Carpenter, J.M. (1996b) Distributional Checklist of Species of the Genus *Polistes* (Hymenoptera: Vespidae; Polistinae, Polistini). *American Museum Novitates*, 3188, 1–39. Available from: <http://iunh2.sci.ibaraki.ac.jp/wasp/list.html> (accessed 21 November 2013)
- Dalla Torre, K.W. de (1904) Vespidae. *Genera Insectorum*, 19, 1–108.
- Das, B.P., Gupta, V.K. (1983) A catalogue of the families Stenogastridae and Vespidae from the Indian subregion (Hymenoptera: Vespoidea). *Oriental Insects*, 17, 395–464.  
<http://dx.doi.org/10.1080/00305316.1983.10433698>
- De Geer, C. (1773) Cinquième mémoire. Des Cigales. *Mémoires pour servir à l'histoire des insectes*, 3, 1–696.
- Fabricius, J.C. (1787) *Mantissa Insectorum, Tom I. Hafniae*, xx + 348 pp.
- Fabricius, J.C. (1793) *Entomologia systematica emendata et aucta. Secundum classes, ordines, genera, species adjectis synonymis, locis, observationibus, descriptionibus. Tome 2*. Christ. Gottl. Proft, Hafniae, viii + 519 pp.
- Gusenleitner, J. (2006) Über Aufsammlungen von Faltenwespen in Indien (Hymenoptera, Vespidae). *Linzer biologische Beiträge*, 38 (1), 677–695.
- Gusenleitner, J. (2011) Eine Aufsammlung von Faltenwespen aus Laos im Biologiezentrum Linz (Hymenoptera: Vespidae: Vespinae, Stenogastrinae, Polistinae, Eumeninae). *Linzer biologische Beiträge*, 43 (2), 1351–1368.
- Kim, J.K. (2001) A new species of genus *Polistes* Latreille (Polistinae, Vespidae, Hymenoptera) from Korea. *Korean Journal of Entomology*, 31 (1), 59–62.
- Kirby, W. & Spence, W. (1826) *An Introduction to Entomology. Ed. 1*, 3. Longman, Hurst, Rees, Orme, and Brown, London, 732 pp.
- Kirby, W. & Spence, W. (1828) *An Introduction to Entomology. Ed. 2*, 5. Longman, Hurst, Rees, Orme, and Brown, London, 731 pp.
- Kojima, J. (1997) Taxonomic notes on the social wasp in the Kanto Plain, central Japan (Insecta: Hymenoptera: Vespidae). *Natural History Bulletin of Ibaraki University*, 1, 17–44.
- Kojima, J. & Hagiwara, Y. (1998) Lectotype designation of four species and one form of the paper wasp genus *Polistes* Latreille, 1802, described from Japan, with notes on the scientific names of Japanese *Polistes* (Insecta: Hymenoptera; Vespidae, Polistinae). *Natural History Bulletin of Ibaraki University*, 2, 247–262.
- Kohl, F.F. (1908) 7. Hymenopteren. In: Rechinger, K. (Ed.), *Botanische und zoologische Ergebnisse einer wissenschaftlichen Forschungsreise nach den Samoa-Inseln, den Neuguinea-Archipel und Solomon-Inseln*. Denkschrift der Kaiserlichen Akademie der Wissenschaften, 81, 306–317.
- Kuo, M.C. & Yeh, W.H. (1987) [Ecological studies on *Vespa*, *Polistes*, *Parapolybia* and *Ropalidia* (Study on Vespidae in Taiwan III)]. *Journal of National Chiayi Institute of Agriculture*, 16, 77–104. [in Chinese with English summary]
- Latreille, P.A. (1802) *Histoire Naturelle, Générale et Particulière des Crustacés et des Insectes. Tome troisième*. F.Dufart, Paris, xii + 464 pp.
- Lee, T.S. (1982) *Hornets from agricultural regions of China (Hymenoptera: Vespoidea)*. Agriculture Publishing House, Beijing, vi + 255 pp. [in Chinese]
- Lee, T.S. (1985) *Fauna of China Economical Insect. Vol. 30. Vespoidea*. China Science Press, Beijing, xii + 159 pp. [in Chinese]
- Lapeletier de St. Fargeau, A.L.M. (1836) *Histoire Naturelle Des Insectes. Hyménoptères. Vol. I*. Roret's Suites à Buffon, Paris, 547 pp.
- Li, T., Sheng, M.L., Sun, S.P., Chen, G.F. & Guo, Z.H. (2012) Effect of the trap color on the capture of ichneumonid wasps (Hymenoptera). *Revista Colombiana de Entomología*, 38 (2), 338–342.
- Liu, C.L. (1937) A bibliographic and synonymic catalogue of the Vespidae of China, with a cross-referring index for the genera

- and species. *Peking Natural History Bulletin*, II (Part 3), 205–232.
- Matsumura, S. (1908) *Nihon Ekichû Mokuroku [List of Japanese Beneficial Insects]*. Rokumeikan, Tokyo, 174 pp. [in Japanese]
- Meunier, F. (1888) Description d'une nouvelle espèce de Sphégides du Brésil. *Journal des Naturalistes de Sicile*, 7, 301–302.
- Nguyen, L.T.P., Kojima, J. & Saito, F. (2011) *Polistes (Polistella)* wasps (Hymenoptera: Vespidae: Polistinae) from mountainous areas of northern Vietnam, with description of five new species. *Zootaxa*, 3060, 1–30.
- Nixon, K.C. & Wheeler, Q.D. (1990) An amplification of the phylogenetic species concept. *Cladistics*, 6, 211–223.  
<http://dx.doi.org/10.1111/j.1096-0031.1990.tb00541.x>
- Pérez, J. (1905) Hyménoptères recueillis dans le Japon central par M.Harmand, Ministre Plénipotentiaire de France à Tokio. *Bulletin du Muséum National d'Histoire Naturelle, Paris*, 23–41.
- Radoszkowski, O. (1887) Hyménoptères de Korée. *Horae Societatis Entomologicae Rossicae*, 21 (3–4), 428–436.
- Saito, F., Kojima, J., Ubaidillah, R. & Hartini S. (2005) Paper wasp of the genus *Polistes* in Eastern Lesser Sunda Islands. *Journal of Hymenoptera Research*, 14 (1), 102–114.
- Saussure, H. de (1853–1958) *Monographie des guêpes sociales ou de la tribu des vespiciens*. Masson, Paris, 255 pp.
- Saussure, H. de (1862) Sur divers Vespides Asiatiques et Africains du Musée de Leyden. *Stettiner Entomologische Zeitung*, 23, 129–207.
- Sheng, M.L., Sun, S.P., Ding, D.S. & Luo, J.G. (2013) *Ichneumonid Fauna of Jiangxi* (Hymenoptera: Ichneumonidae). Science Press, Beijing, 552 pp.
- Smith, F. (1852) Descriptions of some hymenopterous insects captured in India, with notes on their economy, by Ezra T. Downes, Esq., who presented them to the Honourable the East India Company. *Annals and Magazine of Natural History*, 2 (2), 44–50.
- Smith, F. (1857) *Catalogue of Hymenoptera of the British Museum. Part V. Vespidae*. London, 147 pp.
- Starr, C.K. (1992) The social wasps (Hymenoptera: Vespidae) of Taiwan. *Bulletin of the National Museum of Natural Science*, 3, 93–138.
- van der Vecht, J. (1968) The geographic variation of *Polistes (Megapolistes* subg. n.) *rothneyi* Cameron. *Bijdragen Tot de Dierkunde*, 38, 97–109.
- Wang, J.R. (1984) Common species and nest building behaviour of paper wasps from Shaanxi Province. *Journal of Shaanxi Teacher's University*, 1, 61–71.
- Wenzel, J.W. (1998) Generic key to the nests of hornets, yellow jackets, and paper wasps worldwide (Vespidae: Vespinae, Polistinae). *American Museum Novitates*, 3224, 1–39.