

The digger wasps of the genus *Didineis* Wesmael (Hymenoptera: Crabronidae: Bembicinae) of Russia and adjacent territories, with a key to species and new synonymies

PAVEL G. NEMKOV

Institute of Biology and Soil Science, Far Eastern Branch of Russian Academy of Sciences, Vladivostok, 690022, Russia.
E-mail: p_nemkov@mail.ru

Abstract

Ten species of *Didineis* Wesmael 1852 are recorded from Russia and adjacent territories. The new synonymy (valid name listed first) is established for *Didineis bactriana* Gussakovskij 1937 = *D. ogloblini* Gussakovskij 1937, *D. clavimana* Gussakovskij 1937 = *D. turanica* Gussakovskij 1937, and *D. lunicornis* (Fabricius 1798) = *Didineis ruthenica* Gussakovskij 1937. The number of valid species-group taxa in the genus *Didineis* is reduced to 25. The lectotypes are designated for four species: *Didineis bactriana* Gussakovskij 1937, *D. botsharnikovi* Gussakovskij 1937, *D. clavimana* Gussakovskij 1937, *D. ruthenica* Gussakovskij 1937. An original key to the species is provided.

Key words: sand wasps, *Didineis*, Palearctic, fauna

Introduction

Didineis Wesmael 1852 currently includes 28 species distributed worldwide except for the Australian Region (Pulawski 2014). Eighteen species are known from the Palearctic Region and nine from Russia. Most of the species are rarely collected, and some are known from the type series only. Biology is not well known but apparently similar to that of the closely related *Alysson* Panzer 1806 (Bohart & Menke 1976). The females construct nests with several cells in sandy soil. The larvae feed on Homoptera, mainly leafhoppers and fulgorids (Evans & O'Neill 2007, Nemkov 2012).

This paper deals with *Didineis* of Russia and the adjacent territories (the former Soviet Union, Mongolia, northern China, Korean Peninsula, and northern Japan). These wasps have been revised only by Gussakovskij (1937) about 80 years ago. Within the area considered, there are keys to the species of European part of former USSR (Pulawski 1978), Kazakhstan and Middle Asia (Kazenas 1978), and Russian Far East (Nemkov *et al.* 1995).

The current number of the valid species in the genus *Didineis* (including the new synonymies from this paper) is reduced to 25, to 15 in the Palaearctic Region, and to eight in Russia.

Material and methods

About 40 specimens have been studied. The following are abbreviations of the names of institutions in which the type specimens and studied materials are deposited:

IBSS	Institute of Biology and Soils Science, Vladivostok, Russia
MNHAD	Museum of Nature and Human Activities, Hyogo, Japan
NHMW	Naturhistorisches Museum, Wien, Austria
TMB	Természettudományi Múzeum, Budapest, Hungary
ZIN	Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia

Hashimoto and Akinori Nakanishi (Museum of Nature and Human Activities, Hyogo, Japan) for the opportunity to study the wasp collection of K. Tsuneki. I thank Valery M. Loktionov (Institute of Biology and Soil Sciences of Far Eastern Branch of Russian Academy of Sciences, Vladivostok, Russia) for his assistance in preparing photographs. I also thank Wojciech J. Pulawski (California Academy of Sciences, San Francisco, USA), who eliminated many errors and omissions in the manuscript. The work was supported by a grant of RFBR No 14-04-00649 and a President grant for government support of leading scientific schools of the Russian Federation (HIII-150.2014.4).

References

- Birula, A.A. (1914) Materialy dla fauny Hymenoptera Yevropeyskoy Rossii. II. Perechen vidov semeystva Sphecidae okrestnostey g. Vitebska. *Russkoye Entomologicheskoye Obozrenye*, 14, 368–390.
- Bohart, R.M. & Menke, A.S. (1976) *Sphecid Wasps of the World. A generic revision*. Berkeley, Los Angeles, London: University of California Press, ix + 695 pp.
- Curtis, J. (1824–1839) *British Entomology, being illustrations and descriptions of the genera of insects found in Great Britain and Ireland, containing colored figures from nature of the most rare and beautiful species, and in many instances of the plants upon which they are found. 192 parts in 16 volumes*. London: E. Ellis & Co. 769 pl.
- de Beaumont, J. (1965) Les Sphecidae de la Grèce (Hym.). *Mitteilungen der Schweizerischen Entomologischen Gesellschaft*, 38, 1–65.
- de Beaumont, J. & Bytinski-Salz, H. (1959) The Sphecidae (Hymen.) of Eretz Israel. II. Subfam.: Nyssoninae (tribes: Gorytini, Nyssonini, Alyssonini) and Philanthinae. *The Bulletin of the Research Council of Israel. Section B: Zoology*, 8, 99–151.
- de Dalla Torre, C.G. (1897) *Catalogus Hymenopterorum hucusque Descriptorum Systematicus et Synonomicus. Volumen VIII: Fossores (Sphegidae)*. Lipsiae: Guilelmi Engelmann, viii + 750 pp.
- Dovnar-Zapolskiy, D.P. (1940) K poznaniyu fauny pereponchatokrylykh Kurskoy oblasti. *Trudy Tsentralno-Chernozemnogo Gosudarstvennogo Zapovednika im. Prof. Alekhina*, 1, 302–306.
- Elligsen, H. (1998) Die Stechimmenfauna von Magerrasen und Uferabbrüchen in den ukrainischen Vorkarpaten (Hymenoptera: Aculeata). *Entomologische Zeitschrift*, 108, 65–79.
- Fabricius, J.Ch. (1798) *Supplementum Entomologiae Systematicae*. Hafniae: C. G. Proft et Storch, 572 pp.
- Gorobchishin, V.A. (2006) Ryuchchi osy (Hymenoptera, Sphecidae) pidrody Larrinae, Crabroninae, Mellininae, Nyssoninae ta Philanthinae lisostepu Ukrayny (fauna ta ekologichni osoblyvosti). *Pratsi Zoologichnogo Muzeyu Kyiv'skogo Natsional'nogo Universytetu imeni Tarasa Shevchenka*, 4, 105–154.
- Gussakovskij, V.V. (1937) Obzor palearkticheskikh vidov rodov *Didineis* Wesm., *Pison* Latr. i *Psen* Latr. (Hymenoptera, Sphecodea). *Trudy Zoologicheskogo Instituta Akademii Nauk SSSR*, 4, 599–698. [plate. I]
- Handlirsch, A. (1888) Monographie der mit Nysson und Bembex verwandten Grabwespen VI. *Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften. Mathematisch-Naturwissenschaftliche Classe. Abtheilung I*, 96, 219–311. [plates. I–II]
- Handlirsch, A. (1895) Nachträge und Schlusswort zur Monographie der mit Nysson und Bembex verwandten Grabwespen. *Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften. Mathematisch-Naturwissenschaftliche Classe. Abtheilung I*, 104, 801–1079. [plates. I–II]
- Kazenas, V.L. (1978) *Royushchiye osy Kazakhstana i Sredney Azii (Hymenoptera, Sphecidae)*. Opredelitel. Alma Ata: Izdatelstvo Nauka Kazakhskoy SSR, 172 pp.
- Kazenas, V.L. (2001) *Fauna i biologiya rojushchikh os (Hymenoptera, Sphecidae) Kazakhstana i Sredney Azii*. Almaty: KazgosINTI, 333 pp.
- Kokujev, N.R. (1906) O russkikh predstavitelakh podsemeystva Alysonini Dalla Torre (Hymenoptera, Crabronidae). *Horae Societatis Entomologicae Rossicae*, 37, 209–219.
- Mocsáry, A. (1897) Ordo. Hymenoptera. In: *A Magyar Birodalom Állatvilága. A Magyar birodalomból eddig ismert állatok rendszeres lajstroma. Magyarország ezeréves fennállásának emlékére kiadta a k.m. Természettudományi Társulat – Fauna Regni Hungariae. Animalium Hungariae hucusque cognitorum enumeratio systematica. III. Arthropoda. In memoriam regni Hungariae mille abhing annis constituti edidit Regia Societas Scientiarum Naturalium Hungarica*. Budapest, pp. 1–113.
- Mokrousov, M.V. (2010) Fauna rojushchikh os (Hymenoptera: Ampulicidae, Sphecidae, Crabronidae) basseina Verkhney i Sredney Volgi. *Trudy Russkogo Entomologicheskogo Obshchestva*, 81, 59–66.
- Mokrousov, M.V., Berezin, A.Yu. & Egorov, L.V. (2011) Royushchiye osy (Hymenoptera: Ampulicidae, Sphecidae, Crabronidae) Chuvashii. *Eversmannia*, 27–28, 62–86.
- Mosolov, N.A. (1905) *Yestesvenno-istoricheskaya kolleksya gr. E.P. Sheremet'evoy v s. Mikhailovskom, Moskovskoy gubernii. V. Pereponchatokrylyye (Hymenoptera). Spisok pereponchatokrylykh sobrannyykh v Podolskom uyezde*. Moskva, 23 pp.
- Nambu, T. (1975) Konyû-ko makushi moku Saitama-no hati. *Saitama-ken Dôbutsushi Kari-no Moku Roku*, 4, 49–82.
- Nemkov, P.G. (1986) K faune rojushchikh os (Hymenoptera, Sphecidae) Pribaikalya. In: Lehr, P.A., Belokobyl'skiy, S.A. & Storozheva, N.A. (Eds.), *Pereponchatokrylyie Vostochnoi Sibiri i Dalnego Vostoka*. Vladivostok: Akademiya Nauk SSR, Dalnevostochnyi Nauchnyi Tsentr, Biologo-Pochvennyi Institut, pp. 92–110.

- Nemkov, P.G. (1990) Novye i maloizvestnyie vidy rovushchikh os (Hymenoptera, Sphecidae) Vostochnoy Sibiri i Dalnego Vostoka SSSR. In: Lelej, A.S. (Ed.), *Novosti sistematiki nasekomykh Dalnego Vostoka*. Vladivostok: Akademiya Nauk SSSR, Dalnevostochnoe Otdeleniye, Biologo-Pochvennyi Institut, pp. 79–85.
- Nemkov, P.G. (2008) Fauna rovushchikh os (Hymenoptera: Sphecidae, Crabronidae) aziatskoi chasti Rossii. *Chteniya pamyati Alekseya Ivanovicha Kurentsova*, 19, 15–34.
- Nemkov, P.G. (2009) *Annotirovannyi katalog rovushchikh os (Hymenoptera: Sphecidae, Crabronidae) aziatskoi chasti Rossii*. Vladivostok: Dalnauka, 193 pp.
- Nemkov, P.G. (2012) Osobennosti biologii rovushchikh os podsemeystva Bembicinae (Hymenoptera, Crabronidae). *Chteniya pamyati Alekseya Ivanovicha Kurentsova*, 23, 114–132.
- Nemkov, P.G., Kazenas, V.L., Budrys, E.R. & Antropov, A.V. (1995) Nadsem. Sphecoidea. 67. Sem. Sphecidae—Rovushchiye osy. In: Lehr, P.A. (Ed.), *Opredelitel nasekomykh Dalnego Vostoka Rossii v shesti tomakh. Tom IV. Setchatokrylyie, skorpionnitsy, pereponchatokrylyie. Chast 1*. Sankt-Peterburg: Nauka, pp. 368–480.
- Nemkov, P.G. & Lelej, A.S. (2013) A cladistic analysis and classification of the subfamily Bembicinae (Hymenoptera: Crabronidae), with a key to the genera. *Zootaxa*, 3652 (2), 201–231.
<http://dx.doi.org/10.11646/zootaxa.3652.2.1>
- Prisniy, A.V. (2012) Rovushchiye osy (Hymenoptera: Sphecidae, Crabronidae) Belgorodskoy oblasti. *Evraziatskiy Entomologicheskiy Zhurnal*, 11, 44–54.
- Pulawski, W.J. (1978) Nadsem. Sphecoidea. In: Medvedev, G.S. (Ed.), *Opredelitel nasekomykh evropeyskoi chasti SSSR. Tom III. Pereponchatokrylye. Pervaya chast*. Leningrad: Nauka, pp. 173–279.
- Pulawski, W.J. (2014) *Catalog of Sphecidae sensu lato*. California Academy of Sciences, Golden Gate Park, San Francisco, California, USA. Available from: http://researcharchive.calacademy.org/research/entomology/entomology_resources/hymenoptera/sphecidae/ (accessed 15 December 2014)
- Romanova, V.P. (1969) Materialy po faunie rovushchikh os (Hymenoptera Sphecidae) Severnogo Kavkaza. *Entomologicheskoye Obozreniye*, 48, 132–137.
- Rudoiskatel, P.V. (2010) Fauna rovushchikh os (Hymenoptera: Apoidea: Sphecidae, Crabronidae) srednego i yuzhnogo Urala. In: *Ekologiya ot yuzhnukh gor do severnykh morey. Materialy Vserossiyskoy Konferentsii Molodykh Uchenykh Posvyashchennoy 90-letiyu so Dnya Rozhdeniya Akademika P.L. Gorchakovskogo*. Yekaterinburg: Rossiyskaya Akademiya Nauk, Uralskoye Otdeleniye, Institut Ekologii Rasteniy i Zhivotnykh. Goshchitskiy, pp. 145–161.
- Schmid-Egger, Ch. (2011) Order Hymenoptera, families Crabronidae and Sphecidae. *Arthropod Fauna of the UAE*, 4, 488–608.
- Shcherbakov, D.E. (2008) Novye nakhodki pereponchatokrylykh iz Podmoskovya i drugikh regionov Rossii, c zamechaniyami po sinonimii vidov Konowia. *Russkij Entomologicheskiy Zhurnal*, 17, 209–212.
- Shkuratov, A.V. (1998) Dopolneniya k faune rovushchikh os (Hymenoptera, Sphecidae) Rostovskoy oblasti. *Izvestiya Vysshikh Uchebnykh Zavedeniy. Severo-Kavkazskiy Regzon. Estestvennye Nauki*, 3, 97–99.
- Shkuratov, A.V. (2002) Fauna rovushchikh os (Hymenoptera, Sphecidae) stepnogo zapovednika “Rostovskiy” i eyo osobennosti po sravneniyu c faunoy raznotravo-tipchakovo-kovyl'nykh stepey Rostovskoy oblasti. *Trudy Gosudarstvennogo Zapovednika "Rostovskiy"*, 1, 138–156.
- Shkuratov, A.V. (2004) Rovushchiye osy (Hymenoptera: Sphecidae) Rostovskoy oblasti i prilegayushchikh territorii. *Izvestiya Khar'kovskogo Entomologicheskogo Obshchestva*, 11, 70–85.
- Shlyakhtenok, A.S. (2011) O faune os semestv Chrysidae [sic], Tiphidae [sic], Sapygidae, Vespidae, Mutillidae, Pompilidae, Sphecidae, Crabronidae (Hymenoptera, Aculeata) g. Minska. *Trudy Stavropol'skogo Otdeleniya Russkogo Entomologicheskogo Obshchestva*, 7, 92–96.
- Smith, F. (1853) *List of the specimens of British animals in the collection of the British Museum. Part XIII. Nomenclature of Hymenoptera*. London, 74 pp.
- Tano, T. (1994) The type specimens preserved in the Tsuneki collection. (I) Superfamily Sphecoidea (Insecta: Hymenoptera) of Japan. *Entomological Journal of Fukui*, 4, 3–8.
- Terayama, M. (2006) Taxonomic guide to the Japanese Aculeate wasps. 6. Family Nyssonidae. *Tsunekibachi*, 10, 1–27.
- Tsuneki, K. (1968a) Descriptions and records of some fossorial wasps in Japan (Hym., Sphecidae). *Etizenia*, 27, 1–8.
- Tsuneki, K. (1968b) A guide to the study of the Japanese Hymenoptera (24). (S 1). On some sphecid species. *The Life Study (Fukui)*, 12, 65–68.
- Tsuneki, K. (1971) Spheciden aus der Inneren Mongolei und dem nördlichen China (Hym.). *Etizenia*, 58, 1–38.
- Voblenko, A.S., Gorobchishin, V.A. & Nesterov, M.A. (1996) Digger wasps (Hymenoptera, Sphecidae) of Ukrainian Polesye. *Sphecos*, 30, 14–15.
- Wesmael, C. (1852) Revue critique des Hyménoptères Fouisseurs de Belgique. Suite. *Bulletin de l'Académie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique*, 19, 82–110, 261–286, 589–635.
- Yasumatsu, K. (1942) Hymenoptera Aculeata collected by Mr. K. Tsuneki in North China and Inner Mongolia. I. Sphecoidea. 1. List of the species. *Mushi*, 14, 103–115.