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Data Paper

The Insect database in Dokdo, Korea: An updated version in 2020

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Abstract

Background

Dokdo, a group of islands near the East Coast of South Korea, comprises 89 small islands. These volcanic islands were created by an eruption that also led to the formation of the Ulleungdo Islands (located in the East Sea), which are approximately 87.525 km away from Dokdo. Dokdo is important for geopolitical reasons; however, because of certain barriers to investigation, such as weather and time constraints, knowledge of its insect fauna is limited compared to that of Ulleungdo. Until 2017, insect fauna on Dokdo included 10 orders, 74 families, 165 species and 23 undetermined species; subsequently, from 2018 to 2019, we discovered 23 previously unrecorded species and three undetermined species via an insect survey.

New information

As per our recent study, the database of insect species on Dokdo has been expanded to 10 orders, 81 families, 188 species and 23 undetermined species. This database has been

registered in the Global Biodiversity Information Facility (GBIF; www.GBIF.org) and is the first record for insect fauna on Dokdo.

Keywords

biodiversity, Dokdo, insect fauna, newly-recorded species, insect database

Introduction

Islands are known for their ecologically- and biologically-important ecosystems. Due to geographical isolation, the movement of organisms is limited (Franks 2009) and island-like areas have low potential for both species transfer and settlement. For these reasons, as well as their small land area, islands often have low biodiversity (Mauchamp 1997). Island-like areas are also vulnerable to external intrusions, which represent a major threat to indigenous species (Kil et al. 2006). Recent developments in traffic pathways have decreased the number of isolated island ecosystems, thus allowing researchers to investigate the interactions between evolutionary and ecological processes that are responsible for island biodiversity (Gillespie et al. 2008).

The Intergovernmental Panel on Climate Change (IPCC) reports that climate change is causing sea levels and sea temperatures to rise and, if this trend continues, most coastal regions around the world will be at risk (Hong 2010, IPCC 2014). By 2100, these increases in sea level are estimated to reach at least 1 m, creating elevated flooding-related risks for large parts of the low-land island ecosystem, which could lead to significant habitat loss for many organisms worldwide (Bellard et al. 2013). The average annual sea level in Korean coastlines has been rising since 1989 and the average annual rate of sea level rise (5.67 mm/yr) around Ulleungdo has been particularly rapid (Korea Hydrographic and Oceanographic Agency 2020).

The Dokdo Islands, which are located at 37°14'26.8" N and 131°52'10.4" E, belong to an administrative district that includes the Ulleungdo Islands as well. The address of the Korean administrative district is 1-96 Dokdo-ri, Ulleung-eup, Ulleung-gun, Gyeongsangbuk-do, Korea. Tourists cannot stay in Dokdo for more than 30 min, although the Korean Coast Guard (KCG) and some residents can visit for longer time periods. These Islands were formed during the Pliocene Epoch by an underwater volcanic eruption that occurred between 2.5 and 4.6 million years ago (Raman et al. 2016) and subsequently promoted the formation of the Ulleungdo volcanoes via tectonic plate movement (Lee et al. 2002). Dokdo is built on sea floor that is about 2,000 m deep; it comprises two main volcanic islands and 89 small islands (Sohn 1995, Ryu et al. 2012). The nearest land area to Dokdo is Jukbyeon, Uljin-gun, Gyeongsangbuk-do, which is 217.149 km away from Dokdo and 87.525 km from Ulleungdo (Hwang and Park 2007).

Dokdo is entirely composed of volcanic rocks and its island ecosystem is relatively disconnected from the outside world; therefore, it is an important subject for island ecology

and biogeography (Cultural Heritage Administration 2009). In 1982, Dokdo was designated as Natural Monument No. 336 by the Korea Cultural Heritage Administration (KCHA) to be managed by the Dokdo Natural Reserve. Dokdo is very small, with an area of 187,554 m^2 and, because it has been protected and has inaccessible geographical features, there is extremely limited knowledge of its insect fauna. The Dokdo Islands are located at the bridge that connects Ulleungdo in Korea and the Oki Islands in Japan. Due to the fact that previous investigations of insect species on Dokdo played a vital role in characterising the biogeographic limits of these regions, the study of insect fauna on Dokdo is considered to be geographically important (Yasunaga and Duwal 2015).

Since the initial assessment of insects on Dokdo by Jolivet in 1974, many researchers have conducted follow-up studies and, by 2017, 10 orders, 74 families and 165 species of insects have been identified (Jolivet 1974, Yoon 1978, Lee and Kwon 1981, Kwon et al. 1996, An 2000, Korean Ministry of Environment 2001, Ulleung Research Institute of Gyeongju University 2004, Park and Suh 2005, Kim and Yeom 2006, An 2008, Kim et al. 2009, Lee et al. 2009, Park et al. 2010, Park et al. 2011, Park et al. 2013, Daegu Regional Environmental Office 2012, Daegu Regional Environmental Office 2016, Choi et al. 2015, Park et al. 2017, Hwang et al. 2017). Here, we report 23 newly-identified and unrecorded species and three undetermined species on the Island and provide an updated database.

Sampling methods

Study extent: Between September 2017 and September 2018, we collected samples from Dokdo four times, once each at Anyongbok-gil, Ulleung-eup, Ulleung-gun and Gyeongsangbuk-do, Korea (131°52'03.2"E, 37°14'27.2'N), using sweeping, beating, brandishing, black light traps and pitfall traps. The survey was divided into East (Dongdo) and West (Seodo) using terrain isolation (Fig. 1).

Figure 1. doi

Map of Dokdo: East (Dongdo) and West (Seodo) Islands.

Sampling description: In Dongdo, we performed sample collection along the slope leading from the marina, through the KCG facility and then to the old marina. In Seodo, we performed sample collection along a very steep slope leading to the fishermen's dormitory. Seodo has less vegetation distribution compared to Dongdo.

Collected specimen samples were stored in 70% ethanol in conical tubes. They were then transferred to the Animal Systematics and Taxonomy Laboratory and Pest Control Laboratory at Kyungpook National University, Korea. The samples were identified using the national species list of Korea and other references (National Institute of Biological Resources 2019, Chérot and Malipatil 2016, Yasunaga 2017, Göllner-Scheiding 1976, Slater and Zheng 1984, Siwi and Doesburg 1984, Malenovský 2013, ZHANG et al. 2013, Viraktamath 1979, Kim 2012, YOO et al. 2008, Yang et al. 2014, Kurahashi and Samerjai 2018, Suh and Kwon 2017a, Suh and Kwon 2017b, Bourquia et al. 2019, Vane-Wright and Hughes 2007, Ang and Meier 2010).

Database update: We created a new checklist by adding 23 newly-confirmed insect species with reference to the previous reports and compiled it into a database. The data have been registered in the Global Biodiversity Information Facility (GBIF).

Geographic coverage

Description: The survey was divided into Dongdo and Seodo.

Coordinates: 37-14 Latitude; 131-52 and 131-51 longitude.

Taxonomic coverage

Taxa included:

Rank	Scientific Name	Common Name
kingdom	Animalia	Animals
phylum	Arthropoda	Arthropods
class	Insecta	Insects
order	Blattodea	
family	Ectobiidae	
order	Coleoptera	
family	Aphodiidae	
family	Carabidae	
family	Chrysomelidae	
family	Coccinellidae	

family	Curculionidae	
family	Elateridae	
family	Endomychidae	
family	Hydrophilidae	
family	Latridiidae	
family	Mordellidae	
family	Nitidulidae	
family	Oedemeridae	
family	Scirtidae	
family	Staphylinidae	
family	Tenebrionidae	
order	Dermaptera	
family	Anisolabididae	
family	Forficulidae	
order	Diptera	
family	Anthomyiidae	
family	Calliphoridae	
family	Ceratopogonidae	
family	Chironomidae	
family	Chloropidae	
family	Coelopidae	
family	Culicidae	
family	Drosophilidae	
family	Muscidae	
family	Phoridae	
family	Psychodidae	
family	Rhiniidae	
family	Sarcophagidae	
family	Scathophagidae	
family	Sepsidae	
family	Syrphidae	

family	Tephritidae	
family	Tipulidae	
order	Hemiptera	
family	Alydidae	
family	Anthocoridae	
family	Aphididae	
family	Cicadellidae	
family	Cydnidae	
family	Delphacidae	
family	Lygaeidae	
family	Miridae	
family	Nabidae	
family	Pentatomidae	
family	Piesmatidae	
family	Rhopalidae	
family	Rhyparochromidae	
family	Scutelleridae	
family	Tingidae	
family	Triozidae	
order	Hymenoptera	
family	Bethylidae	
family	Braconidae	
family	Chalcididae	
family	Eupelmidae	
family	Formicidae	
family	Ichneumonidae	
family	Pteromalidae	
order	Lepidoptera	
family	Crambidae	
family	Erebidae	
family	Geometridae	

family	Hesperiidae	
family	Lycaenidae	
family	Noctuidae	
family	Nymphalidae	
family	Papilionidae	
family	Plutellidae	
family	Pyralidae	
family	Sphingidae	
family	Tortricidae	
family	Yponomeutidae	
order	Neuroptera	
family	Chrysopidae	
family	Hemerobiidae	
family	Sisyridae	
order	Odonata	
family	Aeshnidae	
family	Coenagrionidae	
family	Libellulidae	
order	Orthoptera	
family	Gryllacrididae	
family	Gryllidae	
family	Mogoplistidae	

Usage licence

Data resources

Data package title: dokdo insect list, 1974-2019

Resource link: https://doi.org/10.15468/h684as

Number of data sets: 1

Data set name: dokdo_insect_list_1974-2019

Download URL: https://www.gbif.org/dataset/eb47a0de-862f-44c0-be42-0e300abaaab4

Data format: CSV.

Column label	Column description
occurrenceID	Unique identifier of the occurrence
basisOfRecord	State of the recorded specimen
eventDate	Date of the data registration
institutionCode	Abbreviation of the institution having custody of the object
scientificName	Full scientific name
ScientificNameAuthorship	The authorship information for the scientificName, formatted according to the conventions of the applicable nomenclaturalCode
collectionCode	Abbreviation of specimen or database
decimalLatitude	Geographic latitude of the collection site
decimalLongitude	Geographic longitude of the collection site
coordinateUncertaintyInMetres	The horizontal distance (in metres) from the given decimalLatitude and decimalLongitude describing the smallest circle containing the whole of the Location
countryCode	Country code
Identification Date	Date for identifying the specimen
Identified by	Identifier for the specimen
stateProvince	Province in which the specimen was collected
county	County in which the specimen was collected
locality	Locality in which the specimen was collected
catalogNumber	Specimen number for occurrence
vernacularName	Common or vernacular name in Korea
kingdom	kingdom name
phylum	phylum name
class	class name
order	order name
family	family name
genus	genus name

Additional information

Results and Discussion

In this study, we first created an initial database, based on the results of surveys of insects on Dokdo from 1974 to 2017. This checklist confirmed the identification of 10 orders, 74 families, 165 species and 23 undetermined species of insects distributed on the Island.

Through our recent sampling, we collected and identified 23 previously unrecorded insect species in Dokdo. Of these species, ten are in the Order Hemiptera (*Leptocorisa chinensis*, *Batracomorphus diminuta*, *Macrosteles striifrons*, *Recilia coronifera*, *Geotomus convexus*, *Creontiades coloripes*, *Nesidiocoris tenuis*, *Glaucias subpunctatus*, *Liorhyssus hyalinus* and *Horridipamera inconspicua*); two are in the Order Coleoptera (*Aphodius urostigma* and *Nacerdes melanura*); ten are in the Order Diptera (*Dasysyrphus bilineatus*, *Scaeva komabensis*, *Sepsis monostigma*, *Lucilia porphyrina*, *Stomorhina obsoleta*, *Sarcophaga brevicornis*, *Sarcophaga peregrina*, *Atherigona oryzae*, *Orchisia costata* and *Culicoides circumscriptus*); and one is in the Order Lepidoptera (*Vanessa indica*) (Fig. 2).

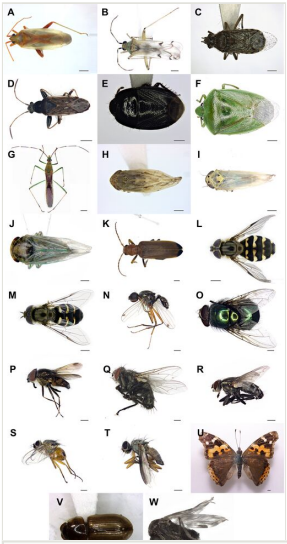

Figure 2. doi

Newly-recorded insect species on Dokdo Island. **A.** *Creontiades coloripes*; **B.**; *Nesidiocoris tenuis*; **C.** *Liorhyssus hyalinus*; **D.** *Horridipamera inconspicua*; **E.** *Geotomus convexus*; **F.** *Glaucias subpunctatus*; **G.** *Leptocorisa chinensis*; **H.** *Recilia coronifera*; **I.** *Macrosteles striifrons*; **J.** *Batracomorphus diminuta*; **K.** *Nacerdes melanura*; **L.** *Dasysyrphus bilineatus*; **M.** *Scaeva komabensis*; **N.** *Sepsis monostigma*; **O.** *Lucilia porphyrina*; **P.** *Stomorhina obsoleta*; **Q.** *Sarcophaga brevicornis*; **R.** *Sarcophaga peregrina*; **S.** *Atherigona oryzae*; **T.** *Orchisia costata*; **U.** *Vanessa indica*; **V.** *Aphodius urostigma*; **W.** *Culicoides circumscriptus*. Scale bars: F, G, L, M, R, U = 2.0 mm; A, C, D, K, O, P, Q = 1.0 mm; B, E, H, I, J, N, S, T, V, W = 0.5 mm.

In addition to the 23 previously unrecorded species on Dokdo, three undetermined species were identified to the genus level: two *Empoasca* species in the Family Cicadellidae and one *Sisyra* species in the Family Sisyridae. Furthermore, five of the 23 previously unrecorded species and one of the three unidentified species belong to new families, adding a total of six newly-added families to the Dokdo Insect Database. Finally, we generated an updated database of insect fauna on Dokdo that contains 10 orders, 81 families, 188 species and 23 unidentified species (Table 1).

Table 1.
The updated database of insect species on Dokdo, based on data collected from 1974 to 2019.

Order	Family	Scientific Name	Newly recorded species	Undetermined name
Blattodea	Ectobiidae	*Blattella nipponica* Asahina, 1963		
Coleoptera	Aphodiidae	*Aphodius urostigma* Harold, 1862	O	
Coleoptera	Carabidae	*Anisodactylus signatus* (Panzer, 1796)		
Coleoptera	Carabidae	*Anisodactylus tricuspidatus* A.Morawitz, 1863		
Coleoptera	Carabidae	*Dolichus halensis* (Schaller, 1783)		
Coleoptera	Carabidae	*Harpalus jureceki* (Jedlicka, 1928)		
Coleoptera	Carabidae	*Harpalus sinicus* Hope, 1845		
Coleoptera	Carabidae	*Stenolophus difficilis* (Hope, 1845)		
Coleoptera	Chrysomelidae	*Callosobruchus chinensis* (Linnaeus, 1758)		
Coleoptera	Chrysomelidae	*Cassida nebulosa* Linnaeus, 1758		
Coleoptera	Chrysomelidae	*Cassida piperata* Hope, 1842		
Coleoptera	Chrysomelidae	*Longitarsus succineus* (Foudras, 1859)		
Coleoptera	Chrysomelidae	*Psylliodes punctifrons* Baly, 1874		
Coleoptera	Chrysomelidae	*Thlaspida biramosa* (Boheman, 1855)		
Coleoptera	Coccinellidae	*Coccinella septempunctata* Linnaeus, 1758		
Coleoptera	Coccinellidae	*Harmonia axyridis* (Pallas, 1773)		
Coleoptera	Coccinellidae	*Harmonia yedoensis* (Takizawa, 1917)		
Coleoptera	Coccinellidae	*Propylea japonica* (Thunberg, 1781)		

Order	Family	Scientific Name	Newly recorded species	Undetermined name
Coleoptera	Coccinellidae	*Scymnus babai* Sasaji, 1971		
Coleoptera	Coccinellidae	*Scymnus ferrugatus* (Moll, 1785)		
Coleoptera	Coccinellidae	*Scymnus* sp. Kugelann, 1794		O
Coleoptera	Curculionidae	*Auleutes* sp. Dietz, 1896		O
Coleoptera	Curculionidae	*Cosmobaris scolopacea* Germar, 1819		
Coleoptera	Curculionidae	*Ceutorhynchus albosuturalis* (Roelofs, 1875)		
Coleoptera	Curculionidae	*Dermestes tessellatocollis* Motschulsky, 1860		
Coleoptera	Curculionidae	*Rhinoncus cribricollis* Hustache, 1916		
Coleoptera	Curculionidae	*Rhinoncus jakovlevi* Faust, 1893		
Coleoptera	Curculionidae	*Scepticus insularis* Roelofs, 1873		
Coleoptera	Curculionidae	*Scepticus uniformis* Kono, 1930		
Coleoptera	Curculionidae	*Sitona lineatus* (Linnaeus, 1758)		
Coleoptera	Elateridae	*Agrypnus miyamotoi* (Nakane & Kishii, 1955)		
Coleoptera	Elateridae	*Melanotus castanipes* (Paykull, 1800)		
Coleoptera	Elateridae	*Melanotus cete* Candèze, 1860		
Coleoptera	Elateridae	*Pectocera fortunei* Candéze, 1873		
Coleoptera	Endomychidae	*Ancylopus melanocephalus* (Olivier, 1808)		
Coleoptera	Endomychidae	*Ancylopus pictus asiaticus* (Strohecker, 1972)		
Coleoptera	Hydrophilidae	*Hydrophilus acuminatus* Motschulsky, 1854		
Coleoptera	Latridiidae	*Cortinicara gibbosa* (Herbst, 1793)		
Coleoptera	Latridiidae	*Stephostethus chinensis* (Reitter, 1877)		
Coleoptera	Mordellidae	*Mordella* sp. Linnaeus, 1758		O
Coleoptera	Mordellidae	*Mordella tokejii* Nomura, 1958		
Coleoptera	Nitidulidae	*Omosita colon* (Linnaeus, 1758)		

Order	Family	Scientific Name	Newly recorded species	Undetermined name
Coleoptera	Nitidulidae	*Omosita japonica* Reitter, 1874		
Coleoptera	Oedemeridae	*Nacerdes melanura* (Linnaeus, 1758)	O	
Coleoptera	Scirtidae	*Cyphon* sp. Paykull, 1799		O
Coleoptera	Staphylinidae	*Aleochara fucicola* Sharp, 1874		
Coleoptera	Staphylinidae	*Atheta* sp. Thomson, 1858		O
Coleoptera	Staphylinidae	*Atheta tokiokai* (K.Sawada, 1971)		
Coleoptera	Staphylinidae	*Cafius histrio* (Sharp, 1874)		
Coleoptera	Staphylinidae	*Neobisnius* sp. Ganglbauer, 1895		O
Coleoptera	Staphylinidae	*Paederus fuscipes* Curtis, 1826		
Coleoptera	Tenebrionidae	*Gonocephalum coenosum* Kaszab, 1952		
Coleoptera	Tenebrionidae	*Gonocephalum coriaceum* Motschulsky, 1857		
Dermaptera	Anisolabididae	*Anisolabis maritima* (Bonelli, 1832)		
Dermaptera	Anisolabididae	*Euborellia annulipes* (H.F.Lucas, 1847)		
Dermaptera	Forficulidae	*Forficula scudderi* de Bormans, 1880		
Diptera	Anthomyiidae	*Delia platura* (Meigen, 1826)		
Diptera	Anthomyiidae	*Fucellia apicalis* Kertesz, 1908		
Diptera	Anthomyiidae	*Fucellia boninensis* Snyder, 1965		
Diptera	Anthomyiidae	*Pegomya cunicularia* (Rondani, 1866)		
Diptera	Calliphoridae	*Calliphora nigribarbis* Smellen van Vollenhoven, 1863		
Diptera	Calliphoridae	*Hemipyrellia ligurriens* (Wiedemann, 1830)		
Diptera	Calliphoridae	*Lucilia illustris* (Meigen, 1826)		
Diptera	Calliphoridae	*Lucilia porphyrina* (Walker, 1856)	O	
Diptera	Calliphoridae	*Lucilia sericata* (Meigen, 1826)		
Diptera	Ceratopogonidae	*Culicoides circumscriptus* Kieffer, 1918	O	
Diptera	Chironomidae	*Polypedilum* sp. Kieffer, 1912		O

Order	Family	Scientific Name	Newly recorded species	Undetermined name
Diptera	Chloropidae	*Thaumatomyia notata* (Meigen, 1830)		
Diptera	Coelopidae	*Coelopa frigida* (Fabricius, 1805)		
Diptera	Culicidae	*Culex orientalis* Edwards, 1921		
Diptera	Culicidae	*Ochlerotatus togoi* (Theobald, 1907)		
Diptera	Drosophilidae	*Drosophila* sp. Fallén, 1823		O
Diptera	Muscidae	*Atherigona oryzae* Malloch, 1925	O	
Diptera	Muscidae	*Musca bezzii* Patton & Cragg, 1913		
Diptera	Muscidae	*Musca hervei* Villeneuve, 1922		
Diptera	Muscidae	*Orchisia costata* (Meigen, 1826)	O	
Diptera	Phoridae	*Megaselia spiracularis* Schmitz, 1938		
Diptera	Psychodidae	*Psychoda alternata* Say, 1824		
Diptera	Psychodidae	*Tinearia alternata* (Say, 1824)		
Diptera	Rhiniidae	*Stomorhina obsoleta* Wiedemann, 1830	O	
Diptera	Sarcophagidae	*Sarcophaga brevicornis* Ho, 1934	O	
Diptera	Sarcophagidae	*Sarcophaga melanura* Meigen, 1826		
Diptera	Sarcophagidae	*Sarcophaga peregrina* (Robineau-Desvoidy, 1830)	O	
Diptera	Scathophagidae	*Scathophaga stercoraria* (Linnaeus, 1758)		
Diptera	Sepsidae	*Sepsis monostigma* Thomson, 1869	O	
Diptera	Syrphidae	*Allobaccha apicalis* (Loew, 1858)		
Diptera	Syrphidae	*Allograpta javana* (Wiedemann, 1824)		
Diptera	Syrphidae	*Betasyrphus serarius* (Wiedemann, 1830)		
Diptera	Syrphidae	*Dasysyrphus bilineatus* (Matsumura, 1917)	O	
Diptera	Syrphidae	*Episyrphus balteatus* (De Geer, 1776)		
Diptera	Syrphidae	*Eristalis cerealis* Fabricius, 1805		
Diptera	Syrphidae	*Eristalis tenax* (Linnaeus, 1758)		

Order	Family	Scientific Name	Newly recorded species	Undetermined name
Diptera	Syrphidae	*Metasyrphus corollae* (Fabricius, 1794)		
Diptera	Syrphidae	*Metasyrphus nitens* (Zetterstedt, 1843)		
Diptera	Syrphidae	*Scaeva komabensis* (Matsumura, 1918)	O	
Diptera	Syrphidae	*Melanostoma mellinum* (Linnaeus, 1758)		
Diptera	Syrphidae	*Sphaerophoria menthastri* (Linnaeus, 1758)		
Diptera	Syrphidae	*Xanthandrus comtus* (Harris, 1780)		
Diptera	Tephritidae	*Campiglossa sada* (Dirlbek & Dirlbekova, 1974)		
Diptera	Tephritidae	*Campiglossa* sp. Rondani, 1870		O
Diptera	Tephritidae	*Ensina sonchi* (Linnaeus, 1767)		
Diptera	Tephritidae	*Trupanea convergens* (Hering, 1936)		
Diptera	Tipulidae	*Tipula* sp. Linnaeus, 1758		O
Hemiptera	Alydidae	*Leptocorisa chinensis* Dallas, 1852	O	
Hemiptera	Anthocoridae	*Orius sauteri* (Poppius, 1909)		
Hemiptera	Anthocoridae	*Orius* sp. Distant, 1904		O
Hemiptera	Aphididae	*Aphis nerii* Fonscolombe, 1841		
Hemiptera	Aphididae	*Aphis rumicis* Linnaeus, 1758		
Hemiptera	Cicadellidae	*Balclutha rubrinervis* Matsumura, 1902		
Hemiptera	Cicadellidae	*Batracomorphus diminuta* Matsumura, 1912	O	
Hemiptera	Cicadellidae	*Empoasca* sp.1 Walsh, 1862		O
Hemiptera	Cicadellidae	*Empoasca* sp.2 Walsh, 1862		O
Hemiptera	Cicadellidae	*Hishimonus sellatus* Uhler, 1896		
Hemiptera	Cicadellidae	*Laburrus impictifrons* Boheman, 1852		
Hemiptera	Cicadellidae	*Macrosteles striifrons* Anufriev, 1968	O	
Hemiptera	Cicadellidae	*Maiestas oryzae* Matsumura, 1902		

Order	Family	Scientific Name	Newly recorded species	Undetermined name
Hemiptera	Cicadellidae	*Psammotettix striatus* Linnaeus, 1758		
Hemiptera	Cicadellidae	*Recilia coronifera* (Marshall, 1866)	O	
Hemiptera	Cydnidae	*Geotomus pygmaeus* (Dallas, 1851)		
Hemiptera	Cydnidae	*Geotomus convexus* Hsiao, 1977	O	
Hemiptera	Delphacidae	*Laodelphax striatellus* (Fallén, 1826)		
Hemiptera	Delphacidae	*Sogatella furcifera* (Horváth, 1899)		
Hemiptera	Delphacidae	*Sogatella kolophon* (Kirkaldy, 1907)		
Hemiptera	Delphacidae	*Unkanodes sapporonus* (Matsumura, 1935)		
Hemiptera	Lygaeidae	*Nysius plebeius* Distant & W.L., 1883		
Hemiptera	Miridae	*Campylomma lividicornis* Reuter, 1912		
Hemiptera	Miridae	*Campylomma* sp. Reuter, 1878		O
Hemiptera	Miridae	*Creontiades coloripes* Hsiao & Meng, 1963	O	
Hemiptera	Miridae	*Nesidiocoris tenuis* (Reuter, 1895)	O	
Hemiptera	Miridae	*Orthotylus flavosparsus* (C.Sahlberg, 1841)		
Hemiptera	Miridae	*Trigonotylus caelestialium* (Kirkaldy, 1902)		
Hemiptera	Nabidae	*Prostemma hilgendorfii* Stein, 1878		
Hemiptera	Pentatomidae	*Glaucias subpunctatus* (Walker, 1867)	O	
Hemiptera	Pentatomidae	*Nezara antennata* Scott, 1874		
Hemiptera	Piesmatidae	*Piesma capitatum* (Wolff, 1804)		
Hemiptera	Piesmatidae	*Piesma maculatum* (Laporte, 1833)		
Hemiptera	Rhopalidae	*Liorhyssus hyalinus* (Fabricius, 1794)	O	
Hemiptera	Rhyparochromidae	*Horridipamera inconspicua* Dallas, 1852	O	
Hemiptera	Rhyparochromidae	*Paradieuches dissimilis* (Distant & W.L., 1883)		

Order	Family	Scientific Name	Newly recorded species	Undetermined name
Hemiptera	Rhyparochromidae	*Stigmatonotum rufipes* (V.Motschulsky, 1866)		
Hemiptera	Scutelleridae	*Cantao ocellatus* (Thunberg, 1784)		
Hemiptera	Tingidae	*Cantacader lethierryi* Scott, 1874		
Hemiptera	Triozidae	*Trioza chenopodi* Reuter, 1876		
Hymenoptera	Bethylidae	*Acrepyris minutus* Yasumatsu, 1955		
Hymenoptera	Braconidae	*Apanteles* sp. Förster, 1862		O
Hymenoptera	Braconidae	*Cotesia* sp.1 Cameron, 1891		O
Hymenoptera	Braconidae	*Cotesia* sp.2 Cameron, 1891		O
Hymenoptera	Braconidae	*Deuterixys* sp. Mason, 1981		O
Hymenoptera	Braconidae	*Lysiphlebus* sp. Förster, 1862		O
Hymenoptera	Chalcididae	*Brachymeria femorata* (Panzer, 1801)		
Hymenoptera	Chalcididae	*Brachymeria minuta* (Linnaeus, 1767)		
Hymenoptera	Eupelmidae	*Eupelmus australiensis* (Girault, 1913)		
Hymenoptera	Eupelmidae	*Eupelmus* sp. Dalman, 1820		O
Hymenoptera	Formicidae	*Hypoponera nippona* (Santschi, 1937)		
Hymenoptera	Formicidae	*Lasius meridionalis* (Bondroit, 1920)		
Hymenoptera	Formicidae	*Monomorium floricola* (Jerdon, 1851)		
Hymenoptera	Formicidae	*Monomorium intrudens* Smith, 1874		
Hymenoptera	Formicidae	*Myrmecina graminicola nipponica* Wheeler, 1906		
Hymenoptera	Formicidae	*Pachycondyla chinensis* (Emery, 1895)		
Hymenoptera	Formicidae	*Pheidole fervida* Smith, 1874		
Hymenoptera	Formicidae	*Ponera japonica* Wheeler, 1906		
Hymenoptera	Formicidae	*Pristomyrmex pungens* Mayr, 1866		
Hymenoptera	Formicidae	*Solenopsis japonica* Wheeler, 1928		
Hymenoptera	Formicidae	*Strumigenys lewisi* Cameron, 1886		

Order	Family	Scientific Name	Newly recorded species	Undetermined name
Hymenoptera	Formicidae	*Tetramorium caespitum* (Linnaeus, 1758)		
Hymenoptera	Ichneumonidae	*Homotropus* sp. Förster, 1869		O
Hymenoptera	Pteromalidae	*Halticoptera circulus* (Walker, 1833)		
Lepidoptera	Crambidae	*Cnaphalocrocis medinalis* Guenée, 1854		
Lepidoptera	Crambidae	*Diaphania indica* (Saunders, 1851)		
Lepidoptera	Crambidae	*Maruca vitrata* (Fabricius, 1787)		
Lepidoptera	Crambidae	*Palpita nigropunctalis* Bremer, 1864		
Lepidoptera	Crambidae	*Spoladea recurvalis* (Fabricius, 1775)		
Lepidoptera	Erebidae	*Catocala dula* Bremer, 1861		
Lepidoptera	Geometridae	*Odontopera arida* Butler, 1878		
Lepidoptera	Geometridae	*Scopula ignobilis* Warren, 1901		
Lepidoptera	Hesperiidae	*Parnara guttatus* Bremer & Grey, 1853		
Lepidoptera	Lycaenidae	*Arhopala bazalus* (Hewitson, 1862)		
Lepidoptera	Lycaenidae	*Pseudozizeeria maha* (Kollar, 1844)		
Lepidoptera	Noctuidae	*Agrotis ipsilon* (Hufnagel, 1766)		
Lepidoptera	Noctuidae	*Arcte coerula* Guenée, 1852		
Lepidoptera	Noctuidae	*Callopistria argyrosticta* Butler, 1881		
Lepidoptera	Noctuidae	*Cosmia achatina* Butler, 1879		
Lepidoptera	Noctuidae	*Daddala lucilla* Butler, 1881		
Lepidoptera	Noctuidae	*Diarsia canescens* Butler, 1878		
Lepidoptera	Noctuidae	*Thyas juno* (Dalman, 1823)		
Lepidoptera	Noctuidae	*Macdunnoughia confusa* (Stephens, 1850)		
Lepidoptera	Noctuidae	*Mythimna separata* (Walker, 1865)		
Lepidoptera	Nymphalidae	*Cynthia cardui* Linnaeus, 1758		
Lepidoptera	Nymphalidae	*Vanessa indica* Herbst, 1794	O	
Lepidoptera	Papilionidae	*Papilio xuthus* Linnaeus, 1767		
Lepidoptera	Plutellidae	*Plutella xylostella* (Linnaeus, 1758)		

Order	Family	Scientific Name	Newly recorded species	Undetermined name
Lepidoptera	Pyralidae	*Oncocera semirubella* (Scopoli, 1763)		
Lepidoptera	Sphingidae	*Macroglossum stellatarum* (Linnaeus, 1758)		
Lepidoptera	Tortricidae	*Adoxophyes orana* (Fischer v.Roslerstamm, 1834)		
Lepidoptera	Tortricidae	*Archips oporana* (Linnaeus, 1758)		
Lepidoptera	Tortricidae	*Cochylidia contumescens* Meyrick, 1931		
Lepidoptera	Tortricidae	*Cochylidia richteriana* (Fischer v.Roslerstamm, 1837)		
Lepidoptera	Tortricidae	*Tortrix sinapina* Butler, 1879		
Lepidoptera	Yponomeutidae	*Yponomeuta meguronis* Matsumura, 1931		
Neuroptera	Chrysopidae	*Chrysopa pallens* (Rambur, 1838)		
Neuroptera	Hemerobiidae	*Hemerobius humulinus* Linnaeus, 1758		
Neuroptera	Sisyridae	*Sisyra* sp. Burmeister, 1839		O
Odonata	Aeshnidae	*Anax parthenope* Selys, 1839		
Odonata	Coenagrionidae	*Ischnura asiatica* Brauer, 1865		
Odonata	Libellulidae	*Pantala flavescens* Fabricius, 1798		
Odonata	Libellulidae	*Rhyothemis fuliginosa* Selys, 1883		
Odonata	Libellulidae	*Sympetrum darwinianum* Selys, 1883		
Orthoptera	Gryllacrididae	*Nippancistroger* sp. Griffini, 1913		O
Orthoptera	Gryllidae	*Teleogryllus emma* (Ohmachi & I.Matsuura, 1951)		
Orthoptera	Gryllidae	*Velarifictorus aspersus* (F.Walker, 1869)		
Orthoptera	Mogoplistidae	*Ornebius kanetataki* (S.Matsumura, 1904)		

Amongst the 23 previously unrecorded species on Dokdo, *B. diminuta* was first discovered in Korea and the remainder of this species has been recorded in the Korean Peninsula. In addition, *C. circumscriptus*, a blood-sucking insect known for being extremely annoying to

the KCG and residents of Dokdo, has been identified for the first time in Dokdo, using a black light trap with dry ice.

The 23 undetermined species that have been identified up to the genus stage are classified as unrecorded or new species in Korea. Due to geographical characteristics, the study of these insects is considered to be very important for understanding the biodiversity of Dokdo Island.

Conflicts of interest

The authors declare that there are no conflicts of interest.

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