

FIRST STUDY OF INSECTS FROM THE TRUONG SA ARCHIPELAGO, KHANH HOA PROVINCE, VIETNAM

Pham Thi Nhi^{1*}, Hoang Vu Tru¹, Pham Van Phu¹, Cao Thi Quynh Nga¹, Nguyen Duc Hiep¹,
Nguyen Quang Cuong¹, Le Xuan Dac², Pham Mai Phuong², Vu Dinh Duy^{2*}

¹*Institute of Ecology and Biological Resources, Vietnam Academy of Science and Technology*

²*Vietnam-Russia Tropical Center*

SUMMARY

On the basis of the recent field surveys conducted during 2020–2021, the first list of insects was reported from the Truong Sa archipelago, Khanh Hoa province, Vietnam. A total of 54 species in 49 genera, 26 families of nine orders have been recorded from eight islands namely Nam Yet, Phan Vinh, Son Ca, Sinh Ton Dong, Sinh Ton, Song Tu Tay, Truong Sa Dong and Truong Sa Lon. Among nine insect orders, Lepidoptera is the most diverse from Truong Sa archipelago with 19 recorded species, followed by Coleoptera with 17 species, Hemiptera with five species, Orthoptera with four species, Blattodea with three species, Diptera and Odonata with two species, each, Dermaptera and Hymenoptera with one species, each. Most insect species recorded from Truong Sa archipelago are widespread on the mainland of Vietnam, whereas two species are recorded for the first time from Vietnam, namely *Derosphaerus vicinus* Pic, 1923 (Coleoptera: Tenebrionidae) and *Utetheisa (Pitasila) inconstans* (Butler, 1880) (Lepidoptera: Actiidae). The tenebrionid beetle *Derosphaerus vicinus* Pic was recorded previously from Indonesia. The actiid moth *Utetheisa (Pitasila) inconstans* (Butler) was known from Taiwan and southern Japanese islands. Our preliminary results enrich the knowledge of insect fauna of Vietnam by filling the gap from the offshore islands, especially from Truong Sa, a well known archipelago of the country.

Keywords: distribution, insect, new record, Truong Sa.

1. INTRODUCTION

Located at coordinates of 6°30' to 12°00' North latitude and 111°20' to 117°20' East longitude, the Truong Sa archipelago includes about 130 islands, shoals, and banks with a total area of about 180,000 km² (Do Cong Thung et al., 2014). Truong Sa is well known for many different types of coral reefs, especially the presence of the ring-shaped coral reefs (atoll) that are very specific to remote islands and not found at any coastal ones. Since 1994, the comprehensive surveys of marine biological resources have obtained a relatively complete assessment of fish, seaweed, benthic organisms, and coral reefs from the Truong Sa archipelago. However, the information of terrestrial organisms, especially insects, from this area is still lacking. Up to date, only the American cockroach, *Periplaneta americana* (Blattodea: Blattidae)

was documented from the Truong Sa archipelago (Ta Huy Thinh *et al.*, 1995). Taking this situation, this paper provides the first list of insects from this archipelago. It is one among our efforts to study biodiversity of terrestrial ecosystems in this area.

2. RESEARCH METHODOLOGY

Two field surveys were conducted at Truong Sa archipelago, of which the first survey was made October to November 2020 and the second from May to June 2021. Eight among 23 floating islands of the Truong Sa archipelago were surveyed. Specimens were collected by hand net, malaise traps and light traps, then preserved in 70% alcohol or in cotton envelopes before being chemically treated and examined in the laboratory. Species identification was based on many scientific references: Habu, 1973; Shinsaku and Gressitt, 1982; D'Abrera, 1985; Hogenes and Treadaway, 1998; Anisyutkin, 2002; Medvedev, 2006; Park *et al.*, 2007; de Vos,

*Correspondence authors: ptnhi2@yahoo.com;
duyinhvu87@gmail.com.

2007; Pisuth, 2008; Schawaller, 2011; Zolotuhin and Ryabov, 2012; Kataev and Wrase, 2013. All specimens are preserved at Institute of Ecology and Biological Resources (IEBR) and Vietnam-Russia Tropical Center (VRCT), Hanoi, Vietnam.

Names and coordinates of eight islands of the archipelago where the surveys conducted are as follow: Nam Yet (10°10'45"N, 114°22'00"E), Phan Vinh (8°58'00"N, 113°41'30"E), Son Ca (10°42'00"N, 114°28'33"E), Sinh Ton Dong (9°54'09"N, 114°33'51"E), Sinh Ton (9°53'07"N, 114°19'46"E), Song Tu Tay (11°25'55"N, 114°18'00"E), Truong Sa Dong (8°55'00"N, 112°21'00"E), Truong Sa Lon (8°38'30"N, 111°55'55"E). Due to the specific conditions of offshore islands, the vegetation in the islands is generally poor in species composition and no endemic species are recorded. Typical woody species are *Casuarina equisetifolia*, *Ternminalia catappa*, *Barringtonia asiatica*,

Messerchmidia argentea, *Cocos nucifera* and some herbaceous plants such as: *Eupatorium odoratum* *Spinifex littoreus* and *Ipomoea pescaprae*.

3. RESULTS AND DISCUSSION

3.1. Species composition of insect from the Truong Sa archipelago

A total of 54 insect species in 49 genera, 26 families of nine orders have been recorded from the Truong Sa archipelago. Of which, Lepidoptera had the highest number of recorded species with 19 species in 17 genera of six families, followed by Coleoptera with 17 species in 14 genera of six families, Hemiptera with five species in five genera of three families, Orthoptera with four species in four genera of three families. Other orders comprised only one to three species, e.g. Blattodea with three species, Diptera and Odonata with two species, each, Dermaptera and Hymenoptera with one species, each (Table 1).

Table 1. List of insect species from Truong Sa archipelago, Vietnam

No.	Scientific name	Recorded area
ORDER BLATTODEA		
I	Family Blaberidae	
1	<i>Pycnoscelus surinamensis</i> (Linnaeus, 1758)	Phan Vinh, Sinh Ton
II	Family Blattidae	
2	<i>Periplaneta americana</i> (Linnaeus, 1758)	Truong Sa Lon
III	Family Ectobiidae	
3	<i>Blattella germanica</i> (Linnaeus, 1767)	Song Tu Tay, Truong Sa Dong
ORDER COLEOPTERA		
IV	Family Brentidae	
4	<i>Cylas formicarius</i> (Fabricius, 1798)	Sinh Ton
V	Family Carabidae	
5	<i>Platymetopus flavilabris</i> (Fabricius, 1798)	Song Tu Tay
6	<i>Stenolophus (Egadroma) sp.</i>	Song Tu Tay
VI	Family Chrysomelidae	
7	<i>Cassida circumdata</i> Herbst, 1799	Sinh Ton Dong, Truong Sa Lon
8	<i>Colasposoma viridicoeruleum</i> Motschulsky, 1860	Sinh Ton, Truong Sa Lon
VII	Family Elateridae	
9	<i>Odontocardus sp.</i>	Sinh Ton, Song Tu Tay

Management of Forest Resources and Environment

No.	Scientific name	Recorded area
VIII Family Scarabaeidae		
10	<i>Anomala cupera</i> (Hope, 1839)	Nam Yet, Sinh Ton, Son Ca, Song Tu Tay, Truong Sa Lon
11	<i>Anomala variegata</i> (Hope, 1831)	Nam Yet, Sinh Ton Dong, Truong Sa Lon
12	<i>Anomala</i> sp.	Song Tu Tay
13	<i>Holotrichia</i> sp.	Truong Sa Lon
14	<i>Maladera</i> sp.	Truong Sa Lon
15	<i>Mimela signaticolis</i> Ohaus, 1902	Nam Yet, Sinh Ton
16	<i>Onthophagus (Paraphanaeomorphus) trituber</i> Wiedemann, 1823	Nam Yet
17	<i>Protaetia (Potosia) neglecta</i> (Hope, 1831)	Son Ca
18	<i>Protaetia (Pachyprotaetia) ventralis</i> (Faimaire, 1893)	Song Tu Tay
IX Family Tenebrionidae		
19	<i>Gonocephalum</i> sp.	Sinh Ton
20	<i>Derosphaerus vicinus</i> Pic, 1923*	Nam Yet
ORDER DERMAPTERA		
X Family Labiduridae		
21	<i>Labidura riparia</i> (Pallas, 1773)	Phan Vinh, Sinh Ton
ORDER DIPTERA		
XI Family Lauxaniidae		
22	<i>Minettia</i> sp.	Sinh Ton
XII Family Piophilidae		
23	<i>Piophila</i> sp.	Sinh Ton
ORDER HEMIPTERA		
XIII Family Cydnidae		
24	<i>Aethus pseudindicus</i> Lis, 1993	Song Tu Tay
XIV Family Reduviidae		
25	<i>Oncocephalus</i> sp.	Sinh Ton, Song Tu Tay
26	<i>Rhynocoris fuscipes</i> (Fabricius, 1787)	Song Tu Tay
XV Family Rhyparochromidae		
27	<i>Dieuches leucoceras</i> (Walker, 1872)	Nam Yet, Sinh Ton, Song Tu Tay
28	<i>Remaudiereana sobina</i> (Distant, 1901)	Sinh Ton Dong, Truong Sa Lon
ORDER HYMENOPTERA		
XVI Family Apidae		
29	<i>Xylocopa (Koptortosoma) bryorum</i> (Fabricius, 1775)	Song Tu Tay
ORDER LEPIDOPTERA		
XVII Family Arctiidae		
30	<i>Utetheisa (Pitasila) inconstans</i> (Butler, 1880)*	Sinh Ton, Song Tu Tay
XVIII Family Crambidae		
31	<i>Diaphania indica</i> (Saunders, 1851)	Song Tu Tay
32	<i>Herpetogramma submarginalis</i> (Swinhoe, 1901)	Truong Sa Lon
33	<i>Spoladea recurvalis</i> (Fabricius, 1775)	Truong Sa Lon
XIX Family Lycaenidae		
34	<i>Euchrysops cnejus</i> (Fabricius, 1798)	Truong Sa Lon

No.	Scientific name	Recorded area
35	<i>Lampides boeticus</i> Linnaeus, 1767)	Truong Sa Lon
36	<i>Zizina otis sangra</i> (Moore, [1866])	Song Tu Tay, Truong Sa Lon
XX	Family Noctuidae	
37	<i>Achaea janata</i> (Linnaeus, 1758)	Sinh Ton, Truong Sa Dong, Truong Sa Lon
38	<i>Achaea serva</i> (Fabricius, 1775)	Truong Sa Lon
39	<i>Anoba</i> sp.	Truong Sa Lon
40	<i>Chrysodeixis minutus</i> Dufay, 1970	Song Tu Tay
41	<i>Eudocima phalonia</i> (Linnaeus, 1763)	Sinh Ton
42	<i>Stictoptera macromma</i> Snellen, 1880	Truong Sa Lon
43	<i>Trigonodes hyppasia</i> (Cramer, 1779)	Truong Sa Lon
XXI	Family Nymphalidae	
44	<i>Hypolimnas bolina jacintha</i> (Drury, [1773])	Sinh Ton, Song Tu Tay, Truong Sa Dong, Truong Sa Lon
XXII	Family Sphingidae	
45	<i>Agrius convolvuli</i> (Linnaeus, 1758)	Son Ca, Sinh Ton
46	<i>Hippotion celerio</i> (Linnaeus, 1758)	Sinh Ton
47	<i>Hippotion rosetta</i> (Swinhoe, 1892)	Song Tu Tay
48	<i>Macroglossum pyrrhosticta</i> Butler, 1875	Phan Vinh, Sinh Ton Dong, Sinh Ton, Truong Sa Lon
ORDER ODONATA		
XXIII	Family Libellulidae	
49	<i>Pantala flavescens</i> Fabricius, 1798	Nam Yet, Phan Vinh, Sinh Ton, Truong Sa Dong, Truong Sa Lon
50	<i>Tramea virginia</i> (Rambur, 1842)	Truong Sa Lon
ORDER ORTHOPTERA		
XXIV	Family Acrididae	
51	<i>Aiolopus thalassinus tamulus</i> (Fabricius, 1798)	Sinh Ton, Song Tu Tay
52	<i>Valanga nigricornis</i> (Burmeister, 1838)	Nam Yet, Sinh Ton
XXV	Family Gryllidae	
53	<i>Gryllodes supplicans</i> (Walker, 1859)	Nam Yet, Phan Vinh, Sinh Ton, Truong Sa Dong
XXVI	Family Pyrgomorphidae	
54	<i>Atractomorpha burri</i> Bolivar 1905	Song Tu Tay

Note: *species recorded for the first time from Vietnam

Among eight floating islands, 23 species represented 42.6% of the total recorded species were found from Sinh Ton, whereas 22 and 20 species occurred at Truong Sa Lon and Song Tu Tay, respectively; nine species were found from Nam Yet; five species were found from Truong Sa Dong and Phan Vinh, each; four species occurred at Sinh Ton Dong and three

species were found from Son Ca.

Of the 54 recorded species from the Truong Sa archipelago, two most common species were recorded from five islands, namely *Anomala cupera* (Coleoptera: Scarabaeidae) and *Pantala flavescens* (Odonata: Libellulidae). Three species were found from four islands, including *Hypolimnas bolima*

jacintha (Lepidoptera: Nymphalidae), *Macroglossum unguis* (Lepidoptera: Sphingidae) and *Gryllodes supplicans* (Orthoptera: Gryllidae). Three species were recorded from three islands, namely *Anomala variegata* (Coleoptera: Scarabaeidae), *Dieuches leucoceras* (Hemiptera: Rhyparochromidae) and *Achaea janata* (Lepidoptera: Noctuidae). Up to 14 species were found from two islands and up to 32 species were recorded from only one island.

3.2. New country records

Most of species from Truong Sa are widespread in the mainland of Vietnam, for example *Anomala variegata* and *Onthophagus*

(*Paraphanaeomorphus trituber* (Coleoptera: Scarabaeidae), *Zizina otis sangra* (Lepidoptera: Lycaenidae), *Hypolimnas bolina jacintha* (Lepidoptera: Nymphalidae), *Agrius convolvuli* (Lepidoptera: Sphingidae), *Aiolopus thalassinus tamulus* (Orthoptera: Acrididae), *Gryllodes supplicans* (Orthoptera: Gryllidae)...Importantly, two species are recorded for the first time from Vietnam, namely *Derosphaerus vicinus* (Coleoptera: Tenebrionidae) and *Utetheisa (Pitasila) inconstans* (Lepidoptera: Acrtiidae). Information of the two new recorded species as below.

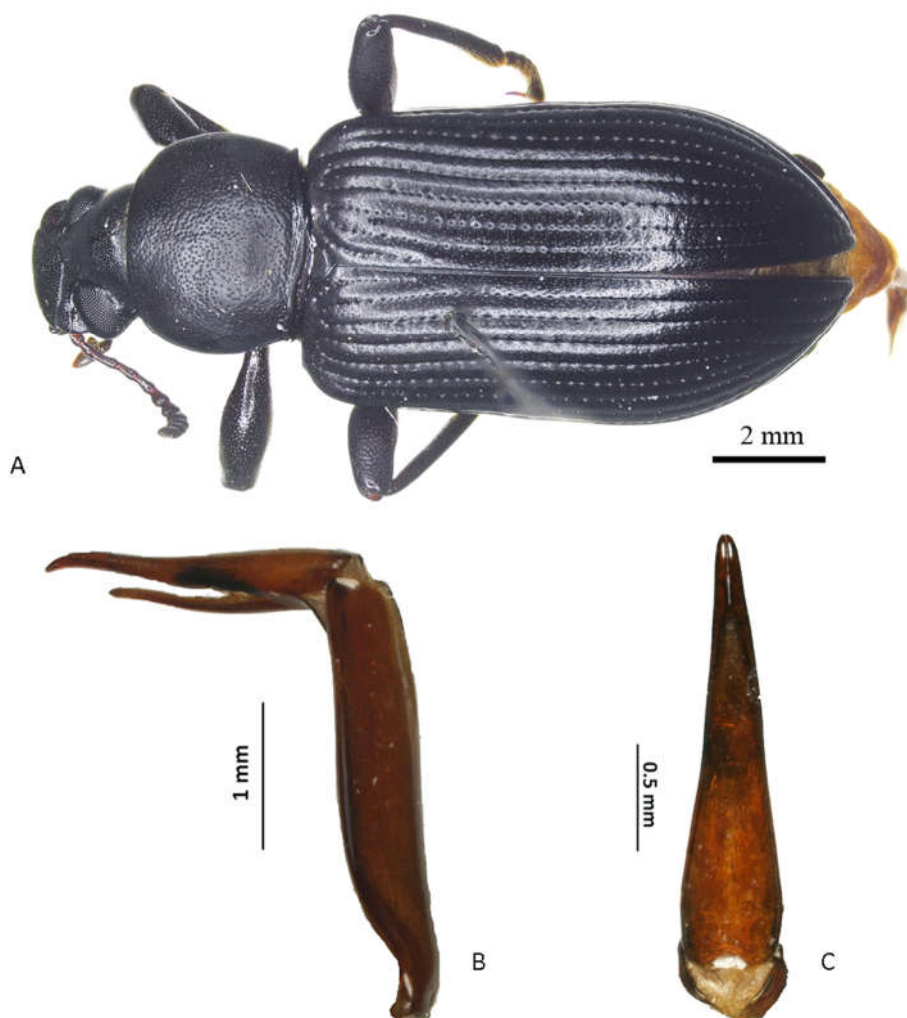


Figure 1. *Derosphaerus vicinus*: A. dorsal view of male; B. lateral view of aedeagus; C. dorsal view of aedeagus

***Derosphaerus vicinus* Pic, 1923**

Derosphaerus vicinus Pic, 1923: 32.

Material examined. 1 male, 2 females (VRTC), Nam Yet, light trap, Le Xuan Dac coll., 7.vi.2021.

Distribution. Previously known from Indonesia (Schawaller, 2011). These are the first records of this species from Vietnam.

Note: Three species of this genus have been

known from Vietnam, namely *Derosphaerus foveolatus* Marseul 1876, *D. pici* Kaszab, 1987 and *D. sinensis* (Hope, 1842) (Merkl, 1992; Tran Thieu Du et al., 2011). *Derosphaerus vicinus* can be recognised from its congeners by its body black, without shining olive-bronze metallic, elytra with deep and fine striae, pronotum with distinct border and structure of male genitalia (Fig. 1).

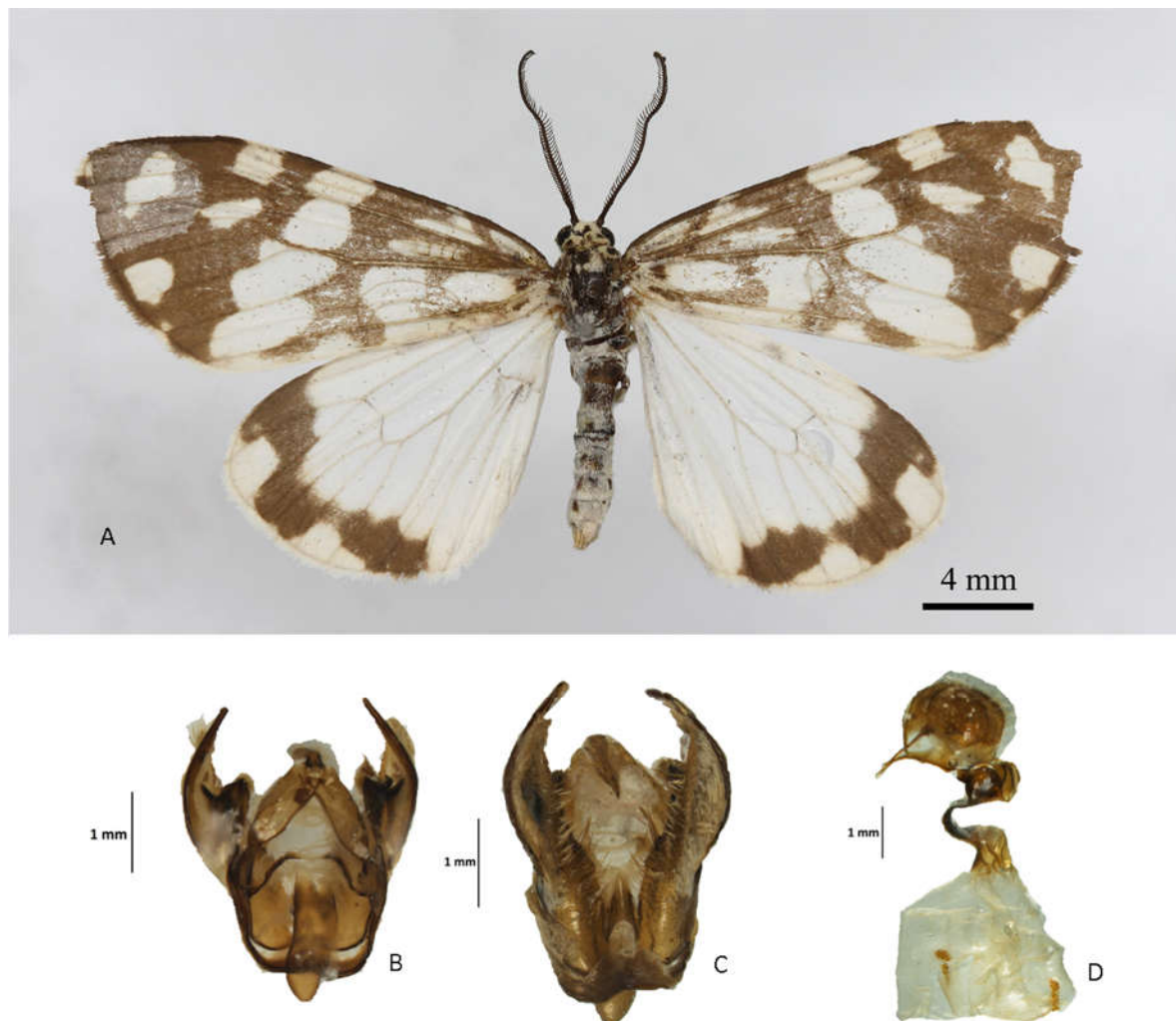


Figure 2. *Utetheisa (Pitasila) inconstans*: A. dorsal view of male; B. dorsal view of male genitalia; C. ventral view of male genitalia; D. female genitalia

***Utetheisa (Pitasila) inconstans* (Butler, 1880)**

Pitasila inconstans Butler, 1880: 672.

Synonyms. *Nyctemera brylancik* Bryk, 1937

Nyctemera okinawensis Inoue, 1982

Utetheisa brylancik Holloway, 1988

Utetheisa okinawensis Holloway 1988

Pitasila okinawensis Sugi, 2002

Material examined. 2 males 2 females (VRTC), Song Tu Tay, light trap, Vu Dinh Duy coll., 17.xi.2020; 3 females (IEBR), Song Tu Tay, light trap, Vu Dinh Duy coll., 18.xi.2020; 1 male 3 females (IEBR), Sinh Ton, light trap, Le Xuan Dac coll., 6.2021.

Distribution. Previously known from Japan and Taiwan (de Vos, 2007). These are the first record of this species from Vietnam.

Note: One species of the subgenus *Pitasila* namely *Utetheisa (Pitasila) varians* (Walker, 1854) was recorded from Vietnam (de Vos, 2007). The newly recorded species can be recognized from the aforementioned species by its milk-white abdomen without dorsal spots, its hind wing pattern and structure of male and female genitalia (Fig. 2).

4. CONCLUSIONS

The first list of 54 insect species was recorded from eight islands of the Truong Sa archipelago, Khanh Hoa Province, Vietnam. Although the species composition of insects from Truong Sa is less diverse than any mainland areas of Vietnam, our findings reveal that the insect fauna of Truong Sa is very similar to that of the mainland of the country. Two species recorded for the first time from Vietnam are closely related to some nearby islands of Indonesia (Borneo and Japa), Japan (Okinawa, the Amanu Islands and the Senkaku Islands in the Ryukyu Archipelago) and Taiwan. With the exploration of two newly recorded species, our results filled the gap of insect fauna of Vietnam from offshore islands.

Acknowledgements

This research was supported by project grant No.KCB-TS04, under the program KCB-TS, Vietnam - Russia Tropical Centre.

REFERENCES

1. Anisyutkin LN. 2002. Notes on the cockroaches of the subfamilies Pycnoscelinae and Diplopterinae from South-East Asia with description of three new species (Dictyoptera: Blaberidae). *Zoosystematica Rossica* 10(2): 351–359.
2. D'Abbrera B. 1985. Butterflies of the Oriental Region, Part 2: Nymphalidae, Satyridae, Amathusidae. Hill House Publishers, 287 pp.
3. De Vos R. 2007. The *Utetheisa* species of the subgenera *Pitasila*, *Atasca* and *Raanya* subgen. (Insecta, Lepidoptera: Arctiidae). *Aldrovandia* 3: 31–120.
4. Do Cong Thung, Chu Van Thuoc, Nguyen Dang

Ngai, Dam Duc Tien, Nguyen Thi Thu, Nguyen Thi Minh Huyen, Nguyen Van Quan, Cao Thu Trang, Le Thi Thuy, Bui Van Vuong 2014. Biodiversity and conservation potential in the Truong Sa archipelago. Science and Technology Publishing House, Hanoi, 302 pp (in Vietnamese).

4. Habu A. 1973. Carabidae: Harpalini (Insecta: Coleoptera). Fauna Japonica. II. Keigaku Publishing Co., Tokyo. xiii + pp. 430, XXIV pls.

5. Hogenes W., Treadaway CG. 1998. The SpHINGIDAE (Lepidoptera) of the Philippines. *Nachrichten des Entomologischen Vereins Apollo* 17: 17–132.

6. Kataev BM., Wrase DW. 2013. Two new species of the subgenus *Egadroma* (genus *Stenolophus*) from South Asia, with redescription of *Stenolophus (Egadroma) ovatulus* (Bates, 1889) (Coleoptera: Carabidae). *Zoosystematica Rossica* 22(2): 258–265.

7. Park KT., Bae YS., Cuong N., Nha PV., Vuong PT. 2007. Moths of North Vietnam. Center for Insect Systematics. Jungthaeng-Sa, pp. 342.

8. Medvedev LN. 2006. To the knowledge of Chrysomelidae (Coleoptera) described by V. Motschulsky. *Russian Entomological Journal* 15(4): 409–417.

9. Merkl O. 1992. Tenebrionidae (Coleoptera) from Laos and Vietnam, with reclassification of Old World “Doliema”. *Acta zoologica Academiae Scientiarum Hungaricae* 38(3–4): 261–280.

10. Pisuth E. 2008. Beetles of Thailand, Siam insect-zoo & Museum, Bangkok, Thailand, pp. 495.

11. Schawaller W. 2011. The genus *Derophaerus* Thomson (Coleoptera: Tenebrionidae: Cnodalonini) in Borneo, with description of a new species. *Stuttgarter Beiträge zur Naturkunde A, Neue Serie* 4: 289–296.

12. Shinsaku K., Gressitt JL. 1982. Chrysomelidae (Coleoptera) of Thailand, Cambodia, Laos and Vietnam. III. Eumolpinae. *Esakia* 18: 1–141.

13. Ta Huy Thinh, Pham Van Luc, Hoang Vu Tru 1995. Preliminary results of study on the cockroach control (*Periplaneta americana*) in Truong Sa islands. *Collection of studies on the Ecology and Biological Resources*. Scientific and Technical Publishing House, Hanoi: 522–527 (In Vietnamese with English summary).

14. Tran Thieu Du, Ta Huy Thinh, Hoang Vu Tru, Pham Hong Thai, Cao Thi Quynh Nga 2011. *Proceedings of the 4th National Scientific Conference on Ecology and Biological Resources*. Agriculture Publishing House, Hanoi: 524–531 (In Vietnamese with English summary).

15. Zolotuhin VV., Ryabov SA. 2012. The hawkmoths of Vietnam. *Korporatsiya Tekhnologiy Prodvizheniya*. Ulyanovsk, pp. 239.

**NGHIÊN CỨU ĐẦU TIÊN VỀ CÔN TRÙNG TẠI QUẦN ĐẢO TRƯỜNG SA,
TỈNH KHÁNH HÒA, VIỆT NAM**

**Phạm Thị Nhị^{1*}, Hoàng Vũ Trụ¹, Phạm Văn Phú¹, Cao Thị Quỳnh Nga¹, Nguyễn Đức Hiệp¹,
Nguyễn Quang Cường¹, Lê Xuân Đắc², Phạm Mai Phương², Vũ Đình Duy^{2*}**

¹*Viện Sinh thái và Tài nguyên Sinh vật, Viện Hàn lâm Khoa học và Công nghệ Việt Nam*

²*Trung tâm Nhiệt đới Việt – Nga*

TÓM TẮT

Dựa trên các chuyến khảo sát gần đây trong hai năm 2020–2021, danh sách côn trùng trên quần đảo Trường Sa, tỉnh Khánh Hòa, Việt Nam lần đầu tiên được công bố. Tổng số 54 loài côn trùng thuộc 49 giống, 26 họ, 9 bộ đã được ghi nhận từ 8 đảo: Nam Yết, Phan Vinh, Sơn Ca, Sinh Tồn Đông, Sinh Tồn, Song Tử Tây, Trường Sa Đông và Trường Sa Lớn. Trong số 9 bộ côn trùng, bộ Cánh vẩy có số loài đa dạng nhất với 19 loài, tiếp đó là các bộ Cánh cứng với 17 loài, Cánh nửa 5 loài, Cánh thẳng 4 loài, Gián 3 loài, Hai cánh và Chuồn chuồn mỗi bộ 2 loài, các bộ Cánh da và Cánh màng, mỗi bộ 1 loài. Phần lớn các loài ghi nhận tại quần đảo Trường Sa đều có phân bố rộng trên đất liền nước ta, trong khi đó hai loài lần đầu được ghi nhận mới cho khu hệ côn trùng Việt Nam là *Derosphaerus vicinus* Pic, 1923 (Coleoptera: Tenebrionidae) và *Utetheisa (Pitasila) inconstans* (Butler, 1880) (Lepidoptera: Acrtiidae). Loài *Derosphaerus vicinus* Pic trước đây được ghi nhận tại Indonesia. Loài *Utetheisa (Pitasila) inconstans* (Butler) trước đây được ghi nhận ở Đài Loan và các đảo miền Nam nước Nhật. Kết quả nghiên cứu bước đầu của chúng tôi đã làm giàu hiểu biết cho khu hệ côn trùng Việt Nam thông qua việc ghi nhận bổ sung các loài từ các đảo xa bờ giống như quần đảo Trường Sa.

Từ khóa: côn trùng, ghi nhận mới, phân bố, Trường Sa.

Received : 02/11/2021

Revised : 01/12/2021

Accepted : 09/12/2021