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Bees of Natural Forests, Teak Plantations and Agricultural Fields in Thailand

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Abstract. Twenty species of bees collected in tropical natural forests, Teak plantations and agricultural fields in various areas in Thailand from 2006 to 2008 are reported. Eighteen species are recorded from Thailand for the first time.

Keywords. taxonomy, Hymenoptera, bees, Thailand, new record.

Introduction

One of the authors, Tasen, has studied pollination biology in tropical natural forests, Teak plantations and agricultural fields in various areas in Thailand from 2006 to 2008 and has accumulated bee specimens. Although precise identification of bee specimens was important for biological studies, taxonomy of bees in Thailand was poorly investigated except for several genera, such as *Apis* and *Trigona* (Sakagami, 1978). Tadauchi visited the National Museum of Natural History (Naturalis) in Leiden, the Netherlands and studied Tasen's bee collection.

In this paper we report 20 species as listed below, based on investigation during Tadauchi's stay in Naturalis. Some specimens which remain unidentified at present are under investigation for the future article. Information about distributions in the list are summarized mainly from a reference database file TABR (Tadauchi *et al.*, 2007) based on tropical Asian bees in Kyushu University. Most of the examined specimens will be kept in the Faculty of Forestry, Kasetsart University, Thailand.

Collecting area

Tasen and his colleague visited the following natural forests, Teak plantations, and agricultural landscape for

collecting bees.

Natural forests: Sakaerat forest at Nakhonratchasima Province, Chiang Dao forest at Chiang Mai Province and PhuKeaw-Nam nao forest complex covering four Provinces in Chaiphumi, Phetchabun, Loei and Khonkaen Provinces. These areas hold diverse and significant habitat in tropical rain forest ecosystems, containing hill evergreen forest, dry evergreen forest, dry deciduous forest, mixed deciduous forest, and secondary forests. Each study site was visited at least two times between 2006 and 2007.

Teak (*Tectona grandis* L.f.) plantation; Maegar Silvicultural Research Station at Phayao Province (19° 10' N, 99° 55' E, 340 m msl), Maetha Silvicultural Research Station at Lampang Province (18° 11' N, 99° 34' E, 336 m msl), Larn-sang Silvicultural Research Station at Tak Province (16° 48' N, 99° 2' E, 373 m msl), Dong-larn Silvicultural Research Station at Khonkaen Province (16° 48' N, 101° 58' E, 363 m msl) and Kao Soi-dao Silvicultural Research Station at Chantaburi Province (12° 58' N, 96° 17' E, 250m msl). The above five areas are mainly managed for teak seed plantation grown at 12x12 m spacing. Observation and collecting were conducted during peak blooming season, from July to August 2007 and 2008.

Agriculture fields: Chiang Mai, Saraburi, Phetchabun and Chaiphum Provinces, maize fields and fruit

orchards were selected for collecting sites for bees. Observation and collecting were conducted during April 2006 to August 2008.

Abbreviation. Dist.: District; Prov.: Province; NT.: Northern part of Thailand; NET.: Northeastern part of Thailand; ET.: Eastern part of Thailand; S.S.: Silvicultural Research Station.

Family Megachilidae

Anthidiellum (Pycanthidium) smithi (Ritsema, 1874)

(Fig. 1)

Anthidium smithii Ritsema, 1874, Rev. Mag. Zool. (Ser. 3), 2: 111 [male].

Anthidiellum (Pycanthidium) smithi: Pasteels, 1972, Bull. Ann. Soc. r. Belg. Ent., 108: 89.

Anthidium minutissium Bingham, 1903, Fasc. Malay. Zool., 1: App. 6 [male].

Anthidium javanicum Friese, 1909, Ann. Mus. Hung., 7: 257 [male].

Specimens examined. [Thailand] 1 female, Phukhieo, Chaiyaphum Prov., NET., 2. iv. 2006 (W. Tasen); 1 male, Chiang Dao Dist., Chiang Mai Prov., NT., 4. i. 2007 (W. Sangnummon).

Distribution. Indonesia, Malaysia, Thailand (new record).

Pseudoanthidium orientale (Bingham, 1897) (Fig. 2)

Anthidium orientale Bingham, 1897, Faun. Brit. India Incl. Ceylon & Burma, Hym. 1: 496 [female].

Pseudoanthidium orientale: ITIS, 2008, <http://www.itis.gov>.

Specimens examined. [Thailand] 1 female, Chiang Dao Dist., Chiang Mai Prov., NT., 18. xii. 2006 (W. Sangnummon).

Distribution. Myanmar (Tenasserim), Thailand (new record).

Pachyanthidium lachrymosum (Smith, 1879) (Fig. 3)

Anthidium lachrymosum Smith, 1879, New Sp. Hym. B. M.: 87 [female & male]; Dalla Torre, 1896, Cat. 10: 463; Bingham, 1897, Faun. Brit. India Incl. Ceylon & Burma, Hym. 1: 492.

Pachyanthidium lachrymosum: ITIS, 2008, <http://www.itis.gov>.

Specimens examined. [Thailand] 1 female, Phukhieo, Chaiyaphum Prov., NET., 2. iv. 2006 (W. Tasen).

Distribution. Myanmar (Tenasserim), India (Bombay, Malabar), Thailand (new record).

Megachile hera Bingham, 1897 (Fig. 4)

Megachile hera Bingham, 1897, Faun. Brit. India Incl. Ceylon & Burma, Hym. 1: 489 [female & male]; Friese, 1914, Tijdschr. Ent. 57: 9; Cockerell, 1920, Philippine Jour. Sci., 16: 147.

Specimens examined. [Thailand] 1 female, Chiang Dao Dist., Chiang Mai Prov., NT., 1. iii. 2006 (W. Sangnummon), 1 female, Maetha S.S., Lampang, Prov., NT., 3. viii. 2008 (W. Tasen); 1 female, Dong-larn S.S., KohnKaen Prov., NT., 4. viii. 2008 (W. Tasen); 1 male, Banthaen Dist., Chaiyaphum Prov., NET., 24. vi. 2006 (W. Tasen).

Distribution. Myanmar (Tenasserim); Indonesia (Java); Philippines (Culasi, Panay), Thailand (new record).

Megachile ornata Smith, 1853 (Fig. 5)

Megachile ornata Smith, 1853, Cat. Hym. Ins. Brit. Mus. I: 183 [female]; Smith, 1858, J. Proc. Linn. Soc. Zool., 2: 42; Smith, 1871, J. Proc. Linn. Soc. Zool., 11: 388.

Specimens examined. [Thailand] 1 female, Chiang Dao Dist., Chiang Mai Prov., NT., 27. xi. 2006 (W. Sangnummon).

Distribution. Indonesia (Borneo), India, Nepal, Thailand (new record).

Megachile semivestituta (Smith, 1853) (Fig. 6)

Chalicodoma semivestituta Smith, 1853, Cat. Hym. Ins. Brit. Mus. I: 148 [male]

Megachile semivestituta: Bingham, 1897, Faun. Brit. India Incl. Ceylon & Burma, Hym. 1: 474.

Specimens examined. [Thailand] 1 male, Chiang Dao Dist., Chiang Mai Prov., NT., 19. x. 2006 (W. Sangnummon); 1 female, Chaing Dao Dist., Chaing Mai

Prov., 14. vi. 2006 (W. Tassen).

Distribution. India, Thailand (new record).

***Megachile fraterna* Smith, 1853**

(Fig. 7)

Megachile semivestituta Smith, 1853, Cat. Hym. Ins. Brit. Mus. I: 178 [female]; Smith, 1871, J. Proc. Linn. Soc. Zool., 11: 387; Bingham, 1897, Faun. Brit. India Incl. Ceylon & Burma, Hym. 1: 478.

Specimens examined. [Thailand] 1 female, Chiang Dao Dist., Chiang Mai Prov., NT., 1. iii. 2006 (W. Sangnummon); 1 female, Dong-larn S.S., Khonkaen Prov., NET., 4. viii. 2008 (W. Tassen).

Distribution. India, Myanmar (Tenasserim), Thailand (new record).

***Megachile amputata* Smith, 1858**

(Fig. 8)

Megachile amputata Smith, 1858, J. Proc. Linn. Soc. Lond., Zool., 2: 45 [female]; Smith, 1871, J. Proc. Linn. Soc. Lond., Zool., 11: 389; Bingham, 1897, Faun. Brit. India Incl. Ceylon & Burma, Hym., 1: 484.

? *Megachile fulvo-fasciata* Radoszkowsky, 1882, Wiadom. z. nauk Przyrod. pt. 2: 81.

Megachile amputata var. *rufescens* Friese, 1905, Zeitschr. Hym. Dipt. 5: 17 [female].

Specimens examined. [Thailand] 1 female, Chaing Dao Dist., Chaing Mai Prov., NT., 14. vi. 2006 (W. Tassen).

Distribution. Sikhim, Myanmar (Tenasserim), Indonesia (Borneo, Sumatra), Thailand (new record).

***Coelioxys capitata* Smith, 1854**

(Fig. 9)

Coelioxys capitata Smith, 1854, Cat. Hym. Ins. Brit. Mus. Part II: 267 [female & male].

Specimens examined. [Thailand] 1 female and 1 male, Chiang Dao Dist., Chiang Mai Prov., NT., 1. iii. 2006 (W. Sangnummon).

Distribution. India (north, Bengal), Sri Lanka, Thailand (new record).

***Coelioxys confusa* Smith, 1875**

(Fig. 10)

Coelioxys confuses Smith, 1875, Trans. Ent. Soc. London, 1875:50 [female]; Dalla Torre, 1896, Cat. 10: 484; Bingham, 1897, Faun. Brit. India Incl. Ceylon & Burma, Hym., 1: 514.

Specimens examined. [Thailand] 1 male, Maegar S.S., Phayao Prov., NT., 2. viii. 2008 (W. Tassen).

Distribution. India (Lucknow, Barrackpore), Myanmar (Tenasserim), Sri Lanka, Thailand (new record).

***Coelioxys decipiens* Spinola, 1838**

(Fig. 11)

Coelioxys decipiens Spinola, 1838, Ann. Soc. Ent. Fr., 7: 532 [female & male]; Dalla Torre, 1896, Cat. 10: 485; Smith, 1854, Cat. 2: 267; Bingham, 1897, Faun. Brit. India Incl. Ceylon & Burma, Hym., 1: 510.

Coelioxys apicata Smith, 1854, Cat. 2: 267,

Specimens examined. [Thailand] 1 female, Chiang Dao Dist., Chiang Mai Prov., NT., 1. iii. 2006 (W. Sangnummon).

Distribution. Egypt, Aden, India (Bengal, South, Punjab: North-West Provinces), Myanmar (Tenasserim), Thailand (new record).

Family Halictidae

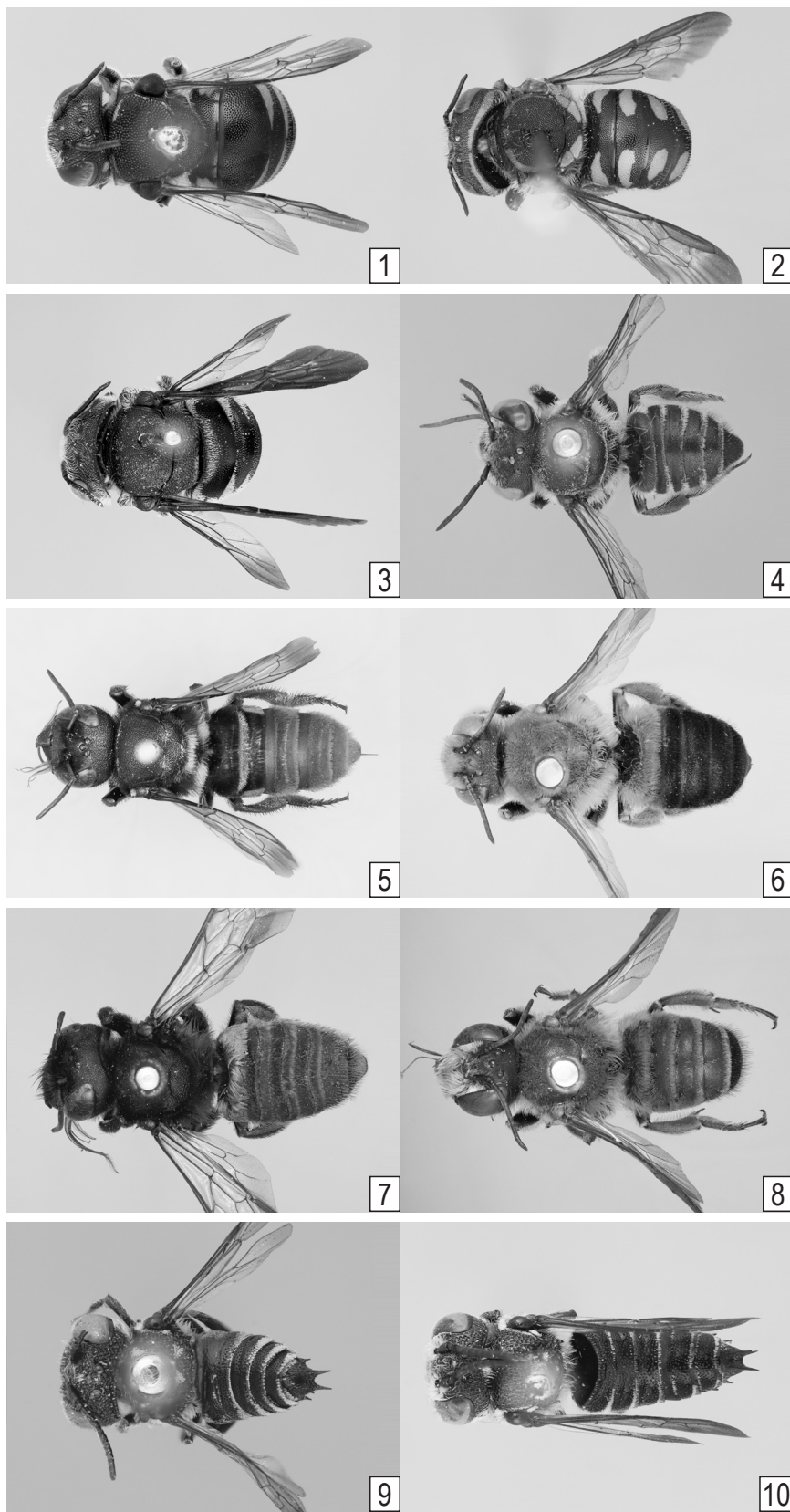
***Nomia clypeata* Smith, 1875**

(Fig. 12)

Nomia clypeata Smith, 1875, Trans. Ent. Soc. London, 1875: 54 [female & male]; Dalla Torre, 1896, Cat. 10: 165; Bingham, 1897, Faun. Brit. India Incl. Ceylon & Burma, Hym. 1: 456.

Specimens examined. [Thailand] 2 females and 1 male, Dong-larn S.S., KhonKaen Prov., NET., 4. viii. 2008 (W. Tassen); 1 female, Chiang Dao Dist., Chiang Mai Prov., NT., 1. iii. 2006 (W. Sangnummon); 1 male, same locality and collector as above, 4. i. 2007.

Distribution. India (Bengal), Myanmar, Thailand (new record).



Figs. 1-10. General habitus in dorsal view of Thai bees in this paper. 1: *Anthidiellum (Pycanthidium) smithi*; 2: *Pseudoanthidium orientale*; 3: *Pachyanthidium lachrymosum*; 4: *Megachile hera*; 5: *Megachile ornata*; 6: *Megachile semivestituta*; 7: *Megachile fraterna*; 8: *Megachile amputata*; 9: *Coelioxys capitata*; 10: *Coelioxys confusa*.

***Nomia albofasciata* Smith, 1875**

(Fig. 13)

Nomia albofasciata Smith, 1875, Trans. Ent. Soc. London, 1875: 57 [female]; Dalla Torre, 1896, Cat. 10: 163; Bingham, 1897, Faun. Brit. India Incl. Ceylon & Burma, Hym., 1: 452; Friese, 1914, Tijdschr. Ent., 57: 6, 31.

Specimens examined. [Thailand] 2 females, Donglarn S.S., KhonKaen Prov., NET., 4. viii. 2008 (W. Taseen); 2 females, Chiang Dao Dist., Chiang Mai Prov., NT., 25. x. 2006 (W. Sangnummon).

Distribution. Indonesia (Java), Myanmar (Tenasserim), Thailand (new record).

Family Apidae

***Thyreus himalayensis* Radoszkowski, 1893**

(Fig. 14)

Crocisa himalayensis Radoszkowski, 1893, Bull. Soc. Imp. Nat. Moscou, Annee 1893, new ser. 7: 171 (male).

Specimens examined. [Thailand] 1 female, Chiang Dao Dist, Chiang Mai Prov., NT., 1. iii. 2006 (W. Sangnummon).

Distribution. Himalaya; Thailand (new record).

***Ceratina dentipes* Friese, 1914**

(Fig. 15)

Ceratina dentipes Friese, 1914, Tijdschr. Ent., 57: 7, 32 [male]; Cockerell, 1915, Entomologist, 48: 109; Cockerell, 1916, Philip. J. Sci., 11: 308; Cockerell, 1918, Philip. J. Sci., 13: 143; Cockerell, 1920, Philip. J. Sci., 16: 207; Hedicke, 1926, Deutsch. Ent. Zeitschr., 1926: 419; Van der Vecht, 1952, Zool. Verh., 16: 27; Baltazar, 1966, Pac. Ins. Monogr., 8: 389.

Specimens examined. [Thailand] 1 female, Banthaen Dist., Chaiyaphum Prov., NET., 24. vi. 2006 (W. Taseen).

Distribution. Indonesia (Java), Thailand, Philippines.

***Ceratina cladula* Cockerell, 1919**

(Fig. 16)

Ceratina cladula Cockerell, 1919, Proc. U. S. Natl. Mus., 55: 173 [female]; Van der Vecht, 1952, Zool. Verh., 16: 39; Baltazar, 1966, Pac. Ins. Monogr., 8: 390.

Specimens examined. [Thailand] 1 female, Donglarn S.S., Khonkaen Prov., NET., 4. viii. 2008 (W. Taseen).

Distribution. Indonesia (Java), Thailand (new record), Philippines.

***Amegilla cingulata* (Fabricius, 1775)**

(Fig. 17)

Apis cingulata Fabricius, 1775, Syst. Ent.: 378.

Anthophora cingulata: Bingham, 1897, Faun. Brit. India Incl. Ceylon & Burma, Hym. 1: 526; Friese, 1911, Deutsch. Entomol. Ztschr., 1911: 450; Ashmead, 1914, J. New York Ent. Soc., 12: 2; Meade-Waldo, 1914, Ann. Mag. Nat. Hist., (8)13: 58; Dover, 1924, Entomologist, 57: 228.

Anthophora zonata var. *cingulata*: Dours, 1869, Mem. Soc. Linn. Nord. Fr., 2: 59.

Podalirius cingulatus Dalla Torre, 1896, Cat. 10: 263, 1896.

Specimens examined. [Thailand] 1 female, Chiang Dao, Dist., Chiang Mai Prov., NT., 1. iii. 2006 (W. Sangnummon).

Distribution. Sikkim; Myanmar (Tenasserim, Pegu Hills), Sri Lanka, Malay Peninsula Australia; Thailand, Philippines.

***Amegilla andrewsi* (Cockerell, 1910)**

(Fig. 18)

Anthophora cigulata andrewsi Cockerell, 1910, Ann. Mag. Nat. Hist., (8)5: 412; Cockerell, 1911, Ann. Mag. Nat. Hist., (8)7: 491; Dover, 1924, Entomologist, 57: 229-230.

Anthophora korotonensis Cockerell, 1911, Ann. Mag. Nat. Hist., (8)7: 491.

Anthophora zonata andrewsi Cockerell, 1910, Ann. Mag. Nat. Hist., (8)5: 412.

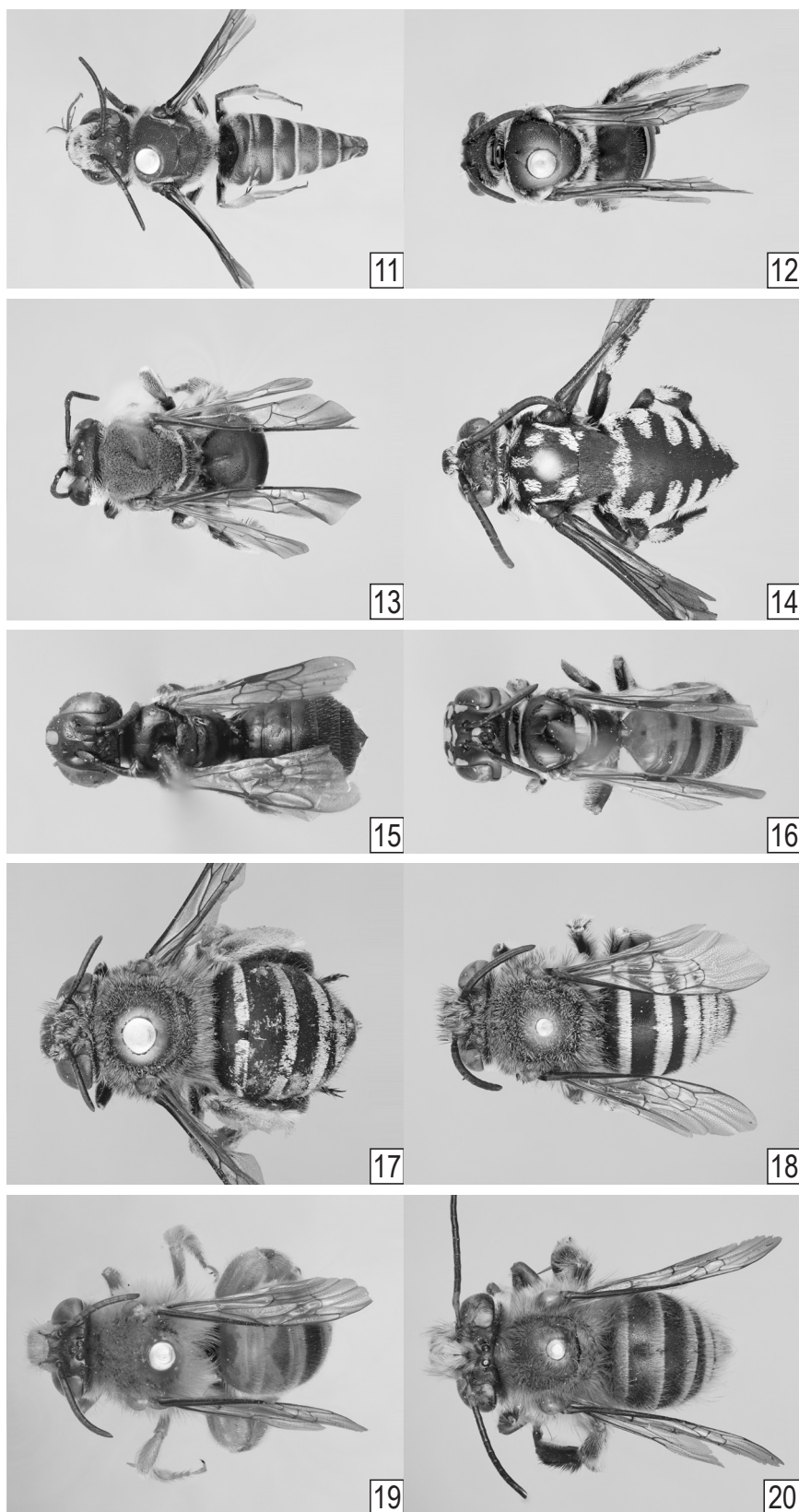
Specimens examined. [Thailand] 1 male, Kao Soi-dao S.S., Chanthaburi Prov., 26. vii. 2006 (W. Taseen).

Distribution. Indonesia (Java, N. W. Borneo, Sarawak, Sumatra); New Guinea; Thailand (new record).

***Habropoda impatiens* Lieftinck, 1944**

(Fig. 19)

Habropoda impatiens Lieftinck, 1944, Treubia, 1: 80 [female & male].



Figs. 11-20. General habitus in dorsal view of Thai bees in this paper. 11: *Coelioxys decipiens*; 12: *Nomia clypeata*; 13: *Nomia albofasciata*; 14: *Thyreus himalayensis*; 15: *Ceratina dentipes*; 16: *Ceratina cladula*; 17: *Amegilla cingulata*; 18: *Amegilla andrewsi*; 19: *Habropoda impatiens*; 20: *Habropoda buconis*.

Specimens examined. [Thailand] 1 male, Chiang Dao Dist., Chiang Mai Prov., NT., 1. iii. 2006 (W. Sangnummon).

Distribution. Indonesia (Sumatra); Thailand (new record).

***Habropoda buconis* (Friese, 1910)**

(Fig. 20)

Anthophora buconis Friese, 1910, *Treubia*, 1: 80 [female & male]; Strand, 1913, *Suppl. Ent.*, 2: 51.

Specimens examined. [Thailand] 2 males, Chaing Dao Dist., Chaing Mai Prov., NT., 14. vi. 2006 (W. Tassen); 1 female, Chiang Dao Dist., Chiang Mai Prov., NT., 27. xi. 2006 (W. Sangnummon).

Distribution. Formosa; Thailand (new record).

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