THE SPHECODIDAE OF SOUTHERN MAINE.

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THE genus *Sphecodes* is represented in this locality by eight species, which have been collected chiefly in July and August. They visit a variety of flowers with easily accessible nectar, but the males have been found most commonly upon the inflorescence of *Solidago*. The species are very variable in coloration, sculpture and the venation of the wings. All of the species described in this paper have the mandibles bidentate. The Maine species may be separated by means of the following key:

FEMALES.

- Mandibles black at base, rufous or rufescent at apices, size larger, over 6 mm. 1.
- Mandibles mainly red or yellowish-red, the apices darker, size smaller, less than 6 mm. 2.
- 1. Abdomen wholly red, or segment 5 black, 9–10 mm. *dichrous* Sm. and
lautus, persimilis, obscurans n. spp.
- Abdomen with segments 4–5 black, 6½–8 mm. *prosporus* n. sp.
- 2. Enclosure of metathorax reticulated, smaller *mandibularis*.
- Enclosure with parallel rugae, larger *levis* n. sp.

MALES.

- Wholly black, joint 4 = 2 + 3 1.
- Black and yellow or red, joint 4 nearly equals 3, small species 2.
- 1. Larger, 8–9 mm. *dichrous*.
- Smaller, 6 mm. *prosporus* n. sp.
- 2. Wings milky white *nephelotus* n. sp.
- Wings dusky 3.
- 3. Enclosure reticulated, mandibles reddish-yellow, with darker red apex,
mandibularis.
- Enclosure with parallel rugae, mandibles dark with red apex *levis* n. sp.

There occur at Waldoboro a small group of bees consisting of *S. dichrous* and a number of closely allied varieties or species, three of which have been named and described in this paper. The precise status of these bees must for the present remain uncertain, as owing to their rarity only one or a few specimens of each kind have been collected; and also because all of the males obtained belong to a single species. Care is necessary lest the table of differential characters prove misleading, since mention of like characters is largely omitted; and unlike characters, which often

require careful attention to be noted, are here readily perceived. In general appearance these bees bear a close resemblance, and their exact relationship can only be determined by a large series of specimens and much additional field study.

Entirely apart from the question of their validity as species the variations presented by these bees in the color of the wings, the color and punctuation of the abdomen, and in several minor particulars are of so much interest that they are worthy of description. They may be separated as follows:

- Wings dusky, abdomen light red, segments 2-4 punctured all over. *lautus* n. sp.
 Wings reddish, abdomen darker 1
 1. Segments 1 and 2 impunctate, or with a few minute punctures, clypeus densely and confluent punctured *persimilis* n. sp.
 Segment 1 impunctate, segments 2-4 finely punctured on basal third, seg. 4 largely, seg. 5 entirely black *obscurans* n. sp.
 Segment 1 distinctly punctured, segments 2-4 with distinct punctures except on apical margins, sometimes a discal spot on segment 1 *dichrous* Sm.

SPHECODES DICHROUS Sm.

1853 *Sphécodes dichroa* Sm. ♀ (not ♂), Cat. Hym. Brit. Mus. 1: 38.

♀.—Length 8 mm. Head and thorax black, abdomen red, a black discal spot on segment 1, the 5th segment black. Face clothed with white hair, punctures on clypeus coarse and remote, front with large deep punctures. Mesothorax shining, with large widely separated punctures. Wings reddish, but less so than in *obscurans* or *persimilis*; tegulae dark, probably variable in color. Metathorax not strongly reticulated, the ridges chiefly longitudinal. Abdomen distinctly but not closely punctured, segment 1 with sparse, well-defined punctures; following segments with distinct punctures except on apical margins.

Taken on *Crataegus coccinea*, June 14. Another specimen collected on *Cornus alternifolia*, the last of June, is referred to this species, with which it agrees in most characters; but the discal spot on the first segment is wanting, or very obscure; and the area of the metathorax is more strongly reticulated.

♂.—Eight black males taken on *Solidago*, August 9, 11, and 17, are temporarily referred to *S. dichrous*. They vary in length from 7-8 mm., and some specimens are broader and more robust than others. The face and sometimes the clypeus is covered with white hair. The mesothorax is coarsely, but not densely punctured, except in front; the metathorax is shining, with short salient ridges, giving it an irregular pitted appearance. The wings vary from nearly hyaline, to hyaline with the apical

margin distinctly clouded with red. The abdomen is very finely and rather sparsely punctured all over.

SPHECODES LAUTUS n. sp.

♀.—Length just over 9 mm. Head and thorax black; abdomen red, of a rather light tint, long and nearly parallel-sided, with the apical segment black. Wings hyaline basally, the apical half strongly smoky, with a dilute blackish, but not at all reddish or yellowish tint. Face covered with white hair. Mesothorax sparsely punctured, shining; area of metathorax strongly, irregularly ridged with no well-defined margin. Abdomen finely punctured, sparsely on basal segment, 2nd and following segments punctured all over.

One specimen on *Spiraea salicifolia*, August 4.

SPHECODES PERSIMILIS n. sp.

♀.—Length 9–10 mm. Head and thorax black; abdomen red of a bright chestnut tint, of normal shape, apical segment red. Wings very strongly reddened. Face with much white hair. Mesothorax densely and coarsely punctured; area of metathorax irregularly subcancellate. Abdominal segments 1 and 2 nearly impunctate, or with a few scattered punctures, basal part of apical segments with small punctures.

Two specimens on Umbelliferous flowers, July 14 and 19.

SPHECODES OBSCURANS n. sp.

♀.—Length about $8\frac{1}{2}$ mm. Head and thorax black; abdomen dark red, the apical segment black, and the penultimate suffused with blackish. Wings very strongly reddish. Face with little hair. Mesothorax dull (probably due to moisture in cyanide jar), with sparse rather weak punctures; area of metathorax strongly reticulated, not well-defined. First segment impunctate, segments 2–4 with minute punctures only on the basal third.

One specimen on *Aralia hispida*, which blooms here in July. Two other specimens, also taken on *Aralia hispida*, July 7 and 16, resemble *S. obscurans*, but differ in several particulars.

In Can. Ent. 36: 232, 1904, there are described from Washington State a similar group of bees closely allied to *S. dichrous*, one of which (*S. arvensiformis* Ckll.) it is noteworthy has the wings dark and very yellow. A comparison of the differential characters of the four Maine species is as follows:

Character.	<i>S. dichrous</i> Sm.	<i>S. obscurans</i> n. sp.	<i>S. lautus</i> n. sp.	<i>S. persimilis</i> n. sp.
Head. Front.	Punctures large and deep with the shining intervals plainly visible.	Punctures very close and quite small, but very distinct. Short transverse head.	Punctures large.	Coarsely punctured, dull.
Eyes.	Black.	Paler.	Intense black.	Apparently brown in life, convex below.
Clypeus	Coarsely punctured.	Large punctures widely separated in the middle, a median sulcus.	Large punctures.	Densely and confluent punctured.
Wings	Reddened, but less so than in <i>obscurans</i> and <i>persimilis</i> .	Strongly reddish.	Dusky hyaline.	Strongly reddish.
Tegulae.	Dark.	Lighter.	Dark.	Lighter.
Mesothorax.	Shining, with widely separated punctures.	Dull, with sparse weak punctures.	Shining, sparsely punctured.	Densely and coarsely punctured.
Area of metathorax.	Ridges chiefly longitudinal, with a few cross ones.	Strongly reticulated, margin not well-defined.	Strongly, irregularly ridged, margin poorly defined.	Irregularly ridged.
Punctuation of abdomen.	Distinctly but not closely punctured 1st segment sparsely segs. 2-4 except on apical margins.	Segment 1 impunctate, segs. 2-4 with minute punctures on basal third.	Finely punctured segment 1 sparsely, segs. 2-4 all over.	Segments 1 and 2 nearly impunctate, segs. 3-4 with small punctures at base.

SPHECODES PROSPHORUS n. sp.

♀.—Length 8 mm. Head and thorax black; abdominal segments 1-3 dark red, very shiny, the apical segments black, or the fourth partly reddish. Face thinly clothed with white pubescence; densely and finely punctuated above the antennae and on the vertex; mandibles bidentate, black at base with dark red apices. Mesothorax smooth and shining, with sparse distinct punctures, the median sulcus evident. Wings dusky hyaline, with a distinct brown tint, stigma and nervures dark rufo-fuscous, tegulae rufo-fuscous. Enclosure of metathorax well-defined

with a salient rim, shining, coarsely reticulated, the reticulations irregular in form but about the same size. Segment 1 with a few small scattered punctures; segments 2-3 with numerous fine punctures at base, the apical margins depressed, smooth and shining; segments 1-3 dark red; apical segments black; segment 3 in some specimens partly clouded with black.

♂.—Length 6 mm. Entirely black, resembles the male of *S. dichrous*, but is smaller with finer punctures; the apical margins of the abdominal segments are depressed, impunctate, and obscurely testaceous. One male taken on *Solidago*, Aug. 9, has only two submarginal cells.

The female was taken on *Crataegus coccinea*, June 14; the male on *Aralia hispida*, July 30; and *Solidago* Aug. 17. This species is allied to *S. dichrous*, but typical specimens may be easily separated by the smaller size of both sexes. It is a neater, more shining species with finer sculpturing, and in the female the abdomen is more largely clouded with black. A female from *Spiraea salicifolia*, July 30, is smaller and duller, the red of the abdomen lighter, with the black apex better defined, and the wings not so brown. It may represent a distinct species, but more material is necessary to decide this question. Compared with the various Rocky Mountain and Pacific Coast species, *S. prosphorus* is not much like any of them, but it has a very close resemblance to the European *S. gibbus*. The male of *gibbus*, however, usually has the abdomen red, except at base and apex.

SPHECODES LEVIS n. sp.

♀.—Length about 5 mm. Head and thorax black; abdomen red with black apical segments; mandibles lively red with the base black, bidentate, the inner tooth small; antennae black, the flagellum faintly reddened beneath. Mesothorax shining, with rather large well separated punctures, the median sulcus distinct but shallow; wings dusky hyaline with dark brown nervures and stigma, tegulae testaceous in front, area of metathorax well-defined, semicircular with parallel longitudinal rugae, but not reticulated, though there are indications of cross lines, giving the rugae a sort of beaded appearance. Abdomen impunctate, segments 1-2 red, segment 3 suffused with blackish, apical segments black.

♂.—Length about 5½ mm. Head and thorax black; abdominal segment 1 black with apical margin yellowish-red; 2nd segment yellowish-red at base, sides and apex, center black; apical segments black. Breadth of head about equal to the length; mandibles black, rufous at tips; antennae black, joint 4 nearly equals 3. Mesothorax shining, rather coarsely punctured: semicircular enclosure of metathorax well-defined with parallel rugae. Wings a light shade of fuscous, stigma and nervures brown, tegulae black.

One female on *Cornus canadensis* late in June, male on *Solidago bicolor*. Readily separated from other Maine bees by the parallel longitudinal rugae of the metathorax.

SPHECODES MANDIBULARIS Cr.

1872 *Sphecodes mandibularis* Cr. ♀, Trans. Am. Ent. Soc. 4: 250.

1897 *Sphecodes mandibularis* Robt. ♀ ♂, Trans. Ac. Sci. St. Louis, 7: 317.

1903 *Sphecodium cressonii* Robt. ♀ ♂, Ent. News, 14: 106.

Two females collected on *Solidago*, July 27 and Aug. 7; the male on *Solidago juncea*, Aug. 7; *Carduus arvensis*, Aug. 6; and on *Solidago*, July 30 to Aug. 25. Of twelve specimens of the male all have the abdomen largely red. One male has the first transverse cubital nervure wanting in one wing and obsolescent in the other.

(The type of *S. mandibularis* Cr. is no longer in existence, but there is a cotype which Mr. Cresson regards as in all respects typical. The cotype, Mr. Viereck informs me, has the mandibles bidentate.—J. H. L.)

SPHECODES NEPHELOTUS n. sp.

♂.—Length 5 mm. Head and thorax black; abdomen largely red, but the apical margins of segments 1–3 are broadly reddish-yellow; on segment 2 the black is often reduced to a narrow, median strip, the base of segment 2 may also be yellow; segment 1 has the base always broadly black. Face clothed with dense, white hair; scape black, flagellum testaceous beneath, blackish above, joint 4 nearly equals 3; mandibles red, dark only at extreme base. Mesothorax shining, with fine, sparse punctures; wings milky-white, nervures and stigma pale brownish; tegulae testaceous; enclosure of metathorax well-defined, obscurely reticulated, the rugae tending to become parallel.

Fourteen males collected on *Carduus arvensis*, Aug. 6; *Solidago juncea*, Aug. 3–7; and *Solidago*, Aug. 17. Easily distinguished by the milky-white wings.

SPHECODES GALERUS n. sp.

♀.—Length $6\frac{1}{2}$ mm. Head and thorax black; abdomen broad, first two segments and base of third dark red, apical segments black. Mandibles dark rufous apically; flagellum dull brown beneath; mesothorax coarsely and closely punctate, opaque; area of metathorax shining, strongly reticulated, with a prominent rim. Wings dusky hyaline, with a brownish tint, nervures and stigma very dark, second submarginal cell narrow, much contracted above.

One specimen from Hampton, New Hampshire, collected by S. A. Shaw, Sept. 9, 1905. Readily known from *S. prosphorus* by its smaller size and much more densely punctured mesothorax. In Robertson's table it runs to *S. clematidis*, but the mesothorax is not at all "strongly sulcate," the abdomen is different, and the nervures and stigma are much darker. The coarse, close punctures of the mesothorax, and the color of the mandibles readily separate it from *S. levis*. The larger size alone separates it at a glance from *S. mandibularis*.

THE NORTH AMERICAN SPECIES OF SPHECODES.

AMERICA NORTH OF MEXICO.

SPHECODES ANTENNARIAE Robt.

1891 *Sphecodes antennariae* Robt. ♀, Trans. Am. Ent. Soc. 18: 63.

1903 *Dialonia antennariae* Robt. ♀ ♂, Ent. News, 14: 105.

SPHECODES ARROYANUS Ckll.

1904 *Sphecodes arroyanus* Ckll. ♀, Ent. 37: 231.

SPHECODES ARVENSIS Patton.

1880 *Sphecodes arvensis* Patton, ♀ ♂, Am. Ent. 3: 230.

1897 *Sphecodes dichrous* Robt. ♀ ♂, Trans. Ac. Sci. St. Louis, 7: 316.

1903 *Sphecodes arvensis* Robt. ♀ ♂, Ent. News, 14: 106.

SPHECODES ASCLEPIADIS Ckll.

1898 *Sphecodes asclepiadis* Ckll. ♀, Bull. Denison Univ. 11: 45.

SPHECODES ARVENSIFORMIS Ckll.

1904 *Sphecodes arvensiformis* Ckll. ♀, Can. Ent. 36: 233.

SPHECODES CLEMATIDIS Robt.

1897 *Sphecodes clematidis* Robt. ♀ ♂, Trans. Ac. Sci. St. Louis, 7: 320.

SPHECODES COLUMBIAE Ckll.

1906 *Sphecodes columbiae* Ckll. ♀, Can. Ent. 38: 280.

SPHECODES CONFERTUS Say.

1837 *Sphecodes confertus* Say, ♀, Bost. Journ. Nat. Hist. 1: 392.

1859 *Sphecodes confertus* Lec. ed. Say's Writ. 2: 771.

1865 *Sphecodes confertus* Sichel, ♀, Ann. Soc. Ent. Fr. 5: 454.

1880 *Sphecodes falcifer* Patton, ♀ ♂, Am. Ent. 3: 230.

1897 *Sphecodes confertus* Robt. ♀, Trans. Ac. Sci. St. Louis, 7: 319.

1903 *Drepanium falciferum* Robt. ♀ ♂, Ent. News, 14: 105.

SPHECODES DAVISII Robt.

1897 *Sphecodes davisii* Robt. ♂, Trans. Ac. Sci. St. Louis, 7: 319.

SPHECODES DICHROUS Sm.

- 1853 *Sphecodes dichroa* Sm. ♀ (not ♂), Cat. Hym. Brit. Mus. 1: 38.
 1865 *Sphecodes dichrous* Sichel, ♀, (not ♂), Ann. Soc. Ent. Fr. 5: 461.
 1882 *Halictus scabrosus* Prov. ♂, Nat. Can. 13: 200.
 1882 *Sphecodes dichroa* Prov. ♀, Nat. Can. 13: 257.
 1883 *Halictus scabrosus* Prov. ♂, Faun. ent. Can. Hym. p. 700.
 1883 *Sphecodes dichroa* Prov. ♀, Faun. ent. Can. Hym. p. 724.
 1904 *Sphecodes dichrous* Ckll. Can. Ent. 36: 304.

SPHECODES EUSTICTUS Ckll.

- 1906 *Sphecodes eustictus* Ckll. ♀, Can. Ent. 38: 162.

SPHECODES FORTIOR Ckll.

- 1898 *Sphecodes fortior* Ckll. ♂, Bull. Denison Univ. 11: 44.

SPHECODES FRAGARIAE Ckll.

- 1903 *Sphecodes fragariae* Ckll. ♀, Trans. Am. Ent. Soc. 24: 98.

SPHECODES HERACLEI Robt.

- 1897 *Sphecodes heraclei* Robt. ♀, Trans. Ac. Sci. St. Louis, 7: 318.
 1903 *Sphecodes heraclei* Robt. ♀ ♂, Ent. News, 14: 105-6.

SPHECODES HESPERELLUS Ckll.

- 1904 *Sphecodes hesperellus* Ckll. ♀ ♂, Can. Ent. 36: 232.

var. PULSATILLAE Ckll.

- 1906 *Sphecodes hesperellus* var. *pulsatillae* Ckll. Ann. Mag. Nat. Hist. ser. 7, 18: 75.

SPHECODES ILLINOIENSIS Robt.

- 1897 *Sphecodes pycnanthemi* Robt. (in part), ♀, Trans. Ac. Sci. St. Louis, 7: 320.
 1903 *Machaeris illinoensis* Robt. ♀, Ent. News, 14: 107.

SPHECODES KINCAIDII Ckll.

- 1898 *Sphecodes kincaidii* Ckll. ♀, Proc. Ac. Nat. Sci. Phil. 1: 56.

SPHECODES KNETSCHI Ckll.

- 1898 *Sphecodes knetschi* Ckll. ♀ ♂, Trans. Am. Ent. Soc. 25: 186.

SPHECODES LEPTANTHI Ckll.

- 1904 *Proteraner leptanthi* Ckll. ♂, Ent. 37: 232.

SPHECODES MANDIBULARIS Cr.

- 1872 *Sphecodes mandibularis* Cr. ♀, Trans. Am. Ent. Soc. 4: 250.
 1888 *Sphecodes mandibularis* Prov. ♀ ♂, Add. faun. Can. Hym. p. 335.
 1897 *Sphecodes mandibularis* Robt. ♀ ♂, Trans. Ac. Sci. St. Louis, 7: 317.
 1903 *Sphecodium cressonii* Robt. ♀ ♂, Ent. News, 14: 106.

SPHECODES MINOR Robt.

1898 *Sphecodes minor* Robt. ♀, Trans. Ac. Sci. St. Louis, 8: 45.

SPHECODES OLYMPICUS Ckll.

1904 *Sphecodes olympicus* Ckll. ♀, Can. Ent. 36: 230.

SPHECODES PECOSENSIS Ckll.

1904 *Sphecodes pecosensis* Ckll. ♀, Ent. 37: 5.

SPHECODES PERLUSTRANS Ckll.

1898 *Sphecodes perlustrans* Ckll. ♀, Bull. Denison Univ. 11: 45.

1899 *Sphecodes perlustrans* Ckll. Can. Ent. 31: 256.

SPHECODES PIMPINELLAE Robt.

1900 *Sphecodes pimpinellae* Robt. ♀, Trans. Ac. Sci. St. Louis, 10: 51.

1903 *Sphecodium pimpinellae* Robt. ♀ ♂, Ent. News, 14: 106.

SPHECODES PYCNANTHEMI Robt.

1897 *Sphecodes pycnanthemī* Robt. ♀, (in part), Tr. Ac. Sci. St. Louis, 7: 320.

1903 *Sphecodium pycnanthemī* Robt. ♀, Ent. News, 14: 106.

SPHECODES RHOIS Ckll.

1904 *Proteraner rhois* Ckll. ♂, Ent. 37: 233.

SPHECODES SEMICOLORATUS Ckll.

1897 *Halictus semicoloratus* Ckll. ♀, Trans. Am. Ent. Soc. 24: 168.

1898 *Sphecodes semicoloratus* Ckll. Trans. Am. Ent. Soc. 25: 186.

SPHECODES SMILACINAE Robt.

1897 *Sphecodes smilacinae* Robt. ♀, Tr. Ac. Sci. St. Louis, 7: 317.

SPHECODES SOPHIAE Ckll.

1898 *Sphecodes sophiae* Ckll. ♀, Bull. Denison Univ., 11: 44.

1904 *Sphecodes sophiae* Ckll. Ent. 37: 232.

SPHECODES STYGIUS Robt.

1893 *Sphecodes stygius* Robt. ♀ ♂, Trans. Am. Ent. Soc. 20: 145.

1897 *Sphecodes stygius* Robt., Trans. Ac. Sci. St. Louis, 7: 317.

1903 *Machaeris stygia* Robt. ♀ ♂, Ent. News, 14: 107.

SPHECODES SULCATULUS Ckll.

1906 *Sphecodes sulcatulus* Ckll. ♀, Bull. Am. Mus. Nat. Hist. 22: 426.

SPHECODES RANUNCULI Robt.

1897 *Sphecodes ranunculi* Robt. ♀ ♂, Trans. Ac. Sci. St. Louis, 7: 318.

1903 *Proteraner ranunculi* Robt. ♀ ♂, Ent. 14: 105.

SPHECODES VEGANUS Ckll.

1904 *Sphecodes veganus* Ckll. ♀, Ent. 37: 5.

SPHECODES WASHINGTONI Ckll.

1904 *Sphecodes washingtoni* Ckll. ♀, Can. Ent. 36: 231.

MEXICO.

SPHECODES ASPERICOLLIS Sichel.

1865 *Sphecodes aspericollis* Sichel, ♀ ♂, Ann. soc. ent. Fr. 5: 457.

SPHECODES BASALIS Sichel.

1865 *Sphecodes basalis* Sichel, ♂ (var.), Ann. soc. ent. Fr. 5: 460.

SPHECODES METANOTIAEUS Sichel.

1865 *Sphecodes metanotiaeus* Sichel, ♂, Ann. soc. ent. Fr. 5: 460.

SPHECODES METATHORACICUS Sichel.

1865 *Sphecodes metathoracicus* Sichel, ♂, Ann. soc. ent. Fr. 5: 456.

SPHECODES PILOSULUS Smith.

1879 *Sphecodes pilosulus* Sm. ♀ ♂, Des. New. Sp. Hym. p. 28.

SPHECODES PUNCTICOLLIS Sichel.

1865 *Sphecodes puncticollis* Sichel, ♀, Ann. soc. ent. Fr. 5: 459.

SPHECODES SUBCONFERTUS Sichel.

1865 *Sphecodes subconfertus* Sichel, ♀ ♂, Ann. soc. ent. Fr. 5: 455

ISLAND OF ST. VINCENT.

SPHECODES NIGRITUS Ashm.

1900 *Sphecodes nigrinus* Ashm. ♂, Trans. Ent. Soc. Lond. 2: 221.

SPHECODES SOLITARIUS Ashm.

1900 *Sphecodes solitarius* Ashm. ♂, Trans. Ent. Soc. Lond. 2: 221.

SPHECODES THORACICUS Ashm.

1900 *Sphecodes thoracicus* Ashm. ♀ ♂, Trans. Ent. Soc. Lond. 2: 222.

In "Synopsis of Sphecodinae" (Ent. News, 14: 103) Mr. Charles Robertson has proposed to divide the local species of *Sphecodes* of Carlinville, Illinois, into the following genera: *Dialonia*, *Drepanium*, *Machaeris*, *Proteraner*, *Sphecodium*, and *Sphecodes* sens. str.