

WEST INDIAN CARABIDÆ VI.  
THE JAMAICAN SPECIES, AND THEIR WINGS

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This paper is the sixth of my series on the carabid beetles of the West Indies. It is the first comprehensive treatment of the Carabidæ of Jamaica. All known Jamaican species (80) are listed taxonomically, and the list is annotated with data on the insects' wings and flight. At the end of the list, the distribution of flying and flightless species in Jamaica is summarized and discussed. The facts here put on record concerning the atrophy of wings of certain species in the mountains of Jamaica will be referred to again in a paper which I have in manuscript, on the wings of Carabidæ of mountains and islands.

The Museum of Comparative Zoölogy possesses a good representation of Jamaican Carabidæ collected by Mr. A. E. Wight, Prof. C. T. Brues, Mr. Chester Roys, and myself, and by some other persons. Besides this, I have had for study as a loan from the United States National Museum about 320 specimens of Carabidæ collected in Jamaica by Dr. E. A. Chapin and Dr. R. E. Blackwelder during the winter of 1937. This borrowed collection really provided the stimulus which has called forth the present paper. It adds several genera and species to the Jamaican list, and contains also numerous specimens taken "flying at dusk" in nets attached to automobiles. Records of species taken actually in flight are unusual, and are very interesting in connection with my studies of Carabid wings.

Species included in the following list without exact locality data are known in Jamaica only from the lowlands, below 1,000 ft. altitude, or are known merely from "Jamaica," presumably from low altitudes. Species noted as "winged" have the inner wings fully developed and apparently fitted for flight in one or more *Jamaican* specimens.



## LIST OF THE CARABIDÆ OF JAMAICA

1. *Calosoma alternans alternans* (Fab.). Winged.
2. *Pachyteles* sp. Blue Mt. Peak, Dec. 13, 1890 (unique in M. C. Z.; collector unknown). This specimen has been submitted to Mr. M. Bänninger, who is not yet ready to describe it. Flightless; wings vestigial.
3. *Distichus granulipygus* Bts. Winged.
4. *Clivina dentipes* Dej. Winged.
5. *Clivina insularis* (J.-D.). Winged.
6. *Clivina biguttata* Putz. Winged.
7. *Oxydrepanus rufus* (Putz.). Winged; "flying at dusk" (Chapin & Blackwelder).
8. *Schizogenius arimao* Darl. Winged.
9. *Bembidion jamaicense* Darl. Slopes of Blue Mts. up to about 4,500 ft., along streams. Winged.
10. *Bembidion darlingtoni* Mutch. Winged.
11. *Bembidion sparsum* (Bts.). Winged; flies actively.
12. *Bembidion chevrolati* (G. & H.). Winged.
13. *Bembidion fastidiosum* (Laf.). Winged.
14. *Pericompsus blandulus* Schm. Winged.
15. *Tachys occultator* Csy. (provisional det.). Winged.
16. *Tachys bradycellinus* Hayw. Winged.
17. *Tachys carib* Darl. In Jamaica, from near sea level to about 4,500 ft. altitude, by streams. Winged; "flying at dusk" (C. & B.).
18. *Tachys abruptus* Darl. In Jamaica, from sea level to about 4,500 ft. altitude, usually by streams. Winged.
19. *Tachys trechulus* Darl. Known only from the types from Blue Mt. Forest Reserve, 5,000-7,000 ft., under deeply buried stones in damp cloudforest, *not* by streams. Flightless, wings vestigial.
20. *Tachys filax* Darl. Winged; "flying at dusk" (C. & B.).
21. *Tachys pumilus* (Dej.). Winged.
22. *Tachys striax* Darl. Winged; "flying at dusk" (C. & B.).
23. *Tachys cubax* Darl. Winged; "flying at dusk" (C. & B.).
24. *Tachys vorax* Lec. Winged.
25. *Tachys proximus* (Say). A single ♂ in the Chapin and Blackwelder collection is the first specimen of this North American species to be found in the West Indies. Winged.



26. *Tachys scitulus* Lec. Winged.
27. *Tachys* (near) *corruscus* Lec. Winged; "flying at dusk" (C. & B.).
28. *Limnastis capito* Bts. Winged; "flying at dusk" (C. & B.).
29. *Micratopus insularis* Darl. Winged.
30. *Perileptus jeanneli* Darl. Near sea level to 4,500 ft., by swift streams. Winged; "flying at dusk" (C. & B.).
31. *Perileptus minutus* Darl. Winged.
32. *Panagæus quadrisignatus* Chev. Winged.
33. *Morion georgiæ* (Beauv.). Winged.
34. *Morion costigerus* Darl. Known only from Cinchona in the Blue Mts., at about 5,000 ft. altitude, in rotten wood and under loose bark of dead trees. Flightless, wings vestigial.
35. *Agonum extensicolle cubanum* Darl. Winged.
- *Colpodes*. This is the principal genus of mountain-inhabiting Carabidæ in the West Indies: 50 species have been found in the Greater Antilles, almost all at considerable altitudes. A few of the species are winged, but the majority are flightless, with atrophied wings. Wing atrophy has evidently occurred independently in several different Antillean stocks of the genus.
36. *Colpodes cinchonæ* Darl. Known only from localities in the Blue Mts., at and above 5,000 ft., under various cover in damp forest. Wings vestigial.
37. *Colpodes faber* Darl. Known only from Blue Mt. Forest Reserve, 5,000-6,000 ft., under cover in wet forest, but (like most other *Colpodes*) *not* by open water. Wings vestigial, elytra ankylosed.
38. *Colpodes vagepunctatus* Darl. Known definitely only from Newton, 3,000 ft. Flightless, wings reduced.
39. *Colpodes macer* Darl. Known from Mandeville (probably mountains near), and from Cinchona in the Blue Mts., 5,000 ft. altitude. Wings vestigial.
40. *Colpodes subovalis* Darl. Known only from Blue Mt. Forest Reserve, about 5,000 ft., in rotten logs and piles of dead vegetation in damp forest. Flightless, wings reduced.



41. *Colpodes bromeliarum* Darl. From near Bath and Portland, at 300 and 1,000 ft. altitude, in epiphytic bromeliads. Winged.
42. *Colpodes roysi* Darl. Near Bath, in an epiphytic bromeliad. Winged.
43. *Colpodes punctus* Darl. Known only from Cinchona in the Blue Mts., at 5,000 ft.; habits unknown, but relationship to two preceding species suggests life in epiphytes.<sup>1</sup> Winged.
44. *Colpodes bruesi* Darl. Known only from Newton, 3,000 ft.; also a member of the *bromeliarum* group. Winged.
45. *Colpodes* sp. (Van Emden MS). Known only from Hartham; apparently another bromeliad species, the most highly specialized in structure of the group. Apparently winged (I have seen a specimen of this species, but did not examine the wings).
46. *Colpodes æquinoctialis* (Chd.). In Jamaica, on slopes of the Blue Mts. below 4,500 ft., along large streams. Winged.
47. *Colpodes latelytra* Darl. Known from a unique from Portland Gap, Blue Mt. Forest Reserve, 5,000 ft., from a pile of recently cut grass; the species may be arboreal. Winged.
48. *Lachnophorus leucopterus* Chev. Lowlands and slopes of Blue Mts. below 4,500 ft., by streams. Winged, flies actively.
49. *Anchonoderus subtilis* Bts. Winged, flies actively.
50. *Euphorticus pubescens* (Dej.). Winged.
51. *Perigona nigriceps* (Dej.). Winged, "flying at dusk" (C. & B.).
52. *Chlænius jamaicæ* Darl. Winged.
53. *Stenous duodecimstriatus* (Chev.). Winged.
54. *Stenous tibialis* (Chev.). Winged.
55. *Selenophorus flavilabris flavilabris* Dej. Winged.
56. *Selenophorus chalybeus* Dej. Winged.
57. *Selenophorus alternans* Dej. Winged.

<sup>1</sup>Since this was written, I have seen specimens of *punctus* in the Philadelphia Academy, collected by Mr. J. A. G. Rehn, definitely "from epiphytic bromeliads", "in mountain forest" at 4,980 and 5,600 ft. in the Blue Mts.



58. *Selenophorus sinuatus* (Gyll.). Winged.
59. *Selenophorus discopunctatus* Dej. Winged.
60. *Selenophorus puncticollis* Putz. Winged.
61. *Selenophorus aeneocupreus* Dej. Winged.
62. *Selenophorus nonseriatus* Darl. Winged.
63. *Bradycellus cubanus* Darl. Winged.
64. *Bradycellus velatus* Darl. Winged.
65. *Acupalpus* (*Stenolophus*) *ochropezus* (Say). Winged,  
"flying at dusk" (C. & B.).
66. *Masoreus brevicillus* Chev. Winged.
67. *Lebia bitaeniata* Chev. Winged.
68. *Lebia cyanea* Dej. Winged.
69. *Lebia abdominalis* Chd. Winged.
70. *Microlestes poeyi* (J.-D.). The single Jamaican specimen I have seen is winged, but *poeyi* has dimorphic wings in Cuba.
71. *Apenes marginalis* (Dej.). Winged.
72. *Apenes coriacea* (Chev.). Winged.
73. *Apenes parallela* (Dej.). Winged.
74. *Apenes aptera* Darl. Known only from Blue Mts., 5,000-7,000 ft., under stones in damp forest. Wings vestigial.
75. *Pentagonica flavipes picipes* Darl. Winged.
76. *Colliuris tetrastigma* Chd. Winged; related species fly actively.
77. *Colliuris limbatus* (Waterh.). This is the only species of Carabidæ recorded from Jamaica which is unknown to me. It is probably related to *C. picta* (Chd.), and is probably winged.
78. *Pseudaptinus apicalis* Darl. Winged.
79. *Pseudaptinus insularis* Mutch. Winged.
80. *Pseudaptinus dorsalis* (Brullé). Winged.

Of the 80 species of Carabidæ listed from Jamaica, some 63 occur in the lowlands, below 1,000 ft. altitude. All of these 63 species, in all the diverse lowland habitats, are winged. Some of them are known to fly well, and it is likely that all, or almost all, fly occasionally.

The middle slopes of the Jamaican mountains, above 1,000 and below 5,000 ft., have not yet been very thoroughly collected for beetles, but a certain number of Carabidæ have been found there. Most are winged. Half a dozen or so winged riparian species follow the mountain brooks up to an alti-



tude of about 4,500 ft., which is about as high as there are brooks in the Jamaican mountains. Some of the same species occur also along lowland streams; others are confined to the banks of the mountain torrents. Two or more winged Colpodes of the *bromeliarum* group occur on the mountain slopes, and probably live between the leaf bases of broad-leaved, pineapple-like bromeliads, in trees. And other winged Carabidæ, some of them lowland species but others perhaps peculiar, are to be expected in proper habitats on the lower and middle mountain slopes.

With increasing altitude, a few flightless Carabidæ, with reduced or vestigial wings, begin to appear among the winged ones, and from the 5,000 ft. level to the highest summit (7,388 ft.) flightless species predominate. Ten species of Carabidæ have been found at or above 5,000 ft. in the Jamaican mountains. Only 2 of the these species, both perhaps arboreal, have fully developed wings. The other 8 species have reduced or vestigial wings, and are flightless. They live chiefly or entirely on the ground in damp cloudforest.

Of course, there is still much to be learned about the details of distribution of Carabidæ in Jamaica, but the main pattern is already very clear. In the lowlands, there is a rather numerous and diverse fauna of Carabidæ, all winged. On the middle slopes of the mountains, there is a smaller, mixed, transition fauna. And at highest altitudes there is a small fauna which is predominantly flightless.

Similar conditions are found throughout the Greater Antilles (*cf.* Darlington, *Memorias de la Sociedad Cubana de Historia Natural* 13, 1939, pp. 79-80). Throughout the lowlands of each island are found numerous and diverse Carabidæ, all or nearly all of which are winged. But wherever mountains rise above 5,000 ft. a few endemic, alticoline, flightless species occur, most of them apparently derived *in situ*, independently on the different mountain tops, from winged ancestors.

This is not an accidental phenomenon. It appears to be the result of the action of powerful environmental forces. But it is difficult to say just what the forces are, for they are complex as well as powerful. I shall try to deal with them in another paper.





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