INDO-PACIFIC TERRESTRIAL TALITRIDAE

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In other papers I have described terrestrial Talitridae from the Marquesas and Society Islands (41)[1] in the south-central Pacific. I now wish to list the species from the Indo-Pacific area as a whole and to compare the talitrid fauna of this region with that of the Atlantic, as well as to add some remarks on special "terrestrial" characters.

All terrestrial Talitridae belong to the genera *Talitrus, Orchestia, Parorchestia,* and *Talorchestia,* but not all species of these genera are terrestrial. Several of them live on the seashore, others in fresh water, and for a few there is no information available regarding habits.

A number of species have been recorded only once and are not well described, or only a single sex is known. An excellent character —not always taken into consideration—seems to be the presence or absence of marginal spines on the outer ramus of uropod 1; this character, therefore, is mentioned below under each species.

Genus TALITRUS Latreille

1. **Talitrus alluaudi** Chevreux.

Talitrus alluaudi Chevreux: Soc. Zool. France, Mém., vol. 14, p. 389, figs., 1901. Stebbing: Das Tierreich, Lief. 21, p. 525, 1906. Stephensen: Vid. Meddel. Dansk Naturh. Foren., Copenhagen, vol. 78, pp. 197-199 (literature and synonymy), 1925. Chevreux and Fage: Amphipodes, Faune de France, no. 9, p. 270, 1925. Hunt: Mar. Biol. Assoc., Plymouth, Jour., vol. 13, no. 4, p. 855, figs., 1925.

Uropod 1 has no marginal spines on the outer ramus. The pleopoda are reduced (5, p. 389, with figs.; 8, p. 270, with figs.).

A. In the open air. Seychelles, in damp soil in the forests, etc.; Madagascar, several localities up to 500 meters; Java, Buitenzorg; Mangareva; Tuamotus (about 23° S., 135° W.).

B. In damp soil in hothouses. Europe (39). Also Sweden: Uppsala, the Botanical garden (kindly communicated by Prof. O.

[1] Numbers in parentheses refer to Literature Cited, p. 18.

Lundblad, Stockholm); Germany, Berlin-Dahlem (25, p. 500); France, several places (8); Great Britain, Lancashire and Cheshire (45); Hungary (23, p. 377); North America, Ohio (47, p. 560).

2. **Talitrus kershawi** Sayce.

Talitrus kershawi Sayce: Roy. Soc. Victoria, Proc., vol. 22, new ser., pt. 1, p. 32, figs., 1909.

Uropod 1 has no marginal spines on the outer ramus. The pleopoda are rudimentary. Victoria (26): "I have gatherings from a considerable number of localities throughout Victoria. They are often associated with *T. sylvaticus*, and rather more numerous than that species." Terrestrial.

3. **Talitrus sylvaticus** Haswell.

Talitrus sylvaticus Haswell, Stephensen: B. P. Bishop Mus., Bull. 142, art. 3.

Genus ORCHESTIA Leach

1. **Orchestia bollonsi** Chilton.

Orchestia bollonsi Chilton: The subantarctic islands of New Zealand, vols. 1, 2, p. 635, figs., 1909.

Uropod 1 has marginal spines on the outer ramus. Subantarctic islands of New Zealand and other islands near New Zealand, under wood and stones, and under guano.

2. **Orchestia chiliensis** Milne-Edwards.

Orchestia chiliensis Milne-Edwards, Stebbing: Das Tierreich, Lief. 21, p. 537, 1906. Schellenberg: Swedish Antarctic Exped. 1901-1903, vol. 2, no. 6, p. 224, 1931.

Uropod 1 has marginal spines on the outer ramus (specimens from New Zealand in the Zoological Museum of Copenhagen, determined by Charles Chilton). Chile, several places, under stones and in small pools between tide marks; Strait of Magellan, Juan Fernandez, New Zealand, "extremely common in most places on the sea shore, and does not seem to extend far beyond high water mark, although under favorable conditions it may be found at some little distance from the beach" (14, p. 81); Chatham Island, east of New Zealand (19, p. 318).

2a. **Orchestia chiliensis** Milne-Edwards variety **gracilis** Chilton.

Orchestia chiliensis gracilis Chilton: Nat. Hist. Juan Fernandez and Easter Island, vol. 3, p. 86, figs., 1921.

Uropod 1 not described. Juan Fernandez: Masatierra, under stones, altitude about 590 meters.

3. **Orchestia costaricana** Stebbing.

Orchestia costaricana Stebbing: U. S. Nat. Mus., Proc., vol. 31, p. 501, figs., 1906.

Uropod 1 has no marginal spines on the outer ramus (according to the figure; not mentioned in the text). Costa Rica: Boca Jesus Maria (on the Pacific coast?) in mangroves in the mud under trunks of trees.

4. **Orchestia ditmari** Derzhavin.

Orchestia ditmari Derzhavin: Russ. Hydrobiol. Zeitschr., vol. 2, p. 187, figs., 1923.

Uropod 1 has 3 marginal spines on the outer ramus. Kamtschatka, fresh water.

5. **Orchestia floresiana** Max Weber.

Orchestia floresiana Weber, Stephensen: B. P. Bishop Mus., Bull. 142, art. 3.

5a. **Orchestia floresiana monospina** Stephensen.

Orchestia floresiana monospina Stephensen: B. P. Bishop Mus., Bull. 142, art. 3.

6. **Orchestia gambariensis** Chevreux.

Orchestia gambariensis Chevreux: Soc. Zool. France, Mém., vol. 20, p. 491, figs., 1908.

Uropod 1 has marginal spines on the outer ramus. Tuamotus; Mangareva, Rikitea, about 23° S., 135° W., under stones and decaying algae on the shore.

7. **Orchestia gammarellus** (Pallas).

Orchestia gammarellus (Pallas), Stebbing: Das Tierreich, Lief. 21, p. 532, 1906. Chevreux and Fage, Amphipodes: Faune de France, no. 9, p. 275, figs., 1925.

Uropod 1 has marginal spines on the outer ramus. Littoral, in damp soil up to 800 meters (33, p. 467). Widely distributed along the Atlantic coasts. Stebbing (36, p. 533) writes: "? South Pacific (Illawara, New South Wales), seashores."

8. Orchestia humicola Martens.

Orchestia humicola Martens, Stebbing: Das Tierreich, Lief. 21, p. 539, 1906.

Uropod 1 has no marginal spines on the outer ramus. Japan, among damp fallen leaves.

9. Orchestia japonica (Tattersall).

Talorchestia japonica Tattersall: Asiatic Soc. Bengal, Calcutta, Mem., vol. 6, p. 452, figs., 1922.

Uropod 1 has no marginal spines on the outer ramus. The eyes are reduced: "Some of the specimens have the pigment of the eyes imperfectly developed and irregularly arranged. Chilton (10, p. 167) has called attention to similar specimens of *Talorchestia parvispinosa*" (43). Is probably an *Orchestia,* for there is a marked palm on pereiopod 1 of female (Tattersall: "2nd thoracic limb of female," 1922, pl. 21, fig. 1). Japan: Hondo, Lake Biwa, among damp weeds on the shore.

10. Orchestia kokuboi Uéno.

Orchestia kokuboi Uéno: Sci. Rep. Tohoku Imp. Univ., 4th ser., Biol., vol. 4, no. 1, fasc. 1, p. 7, figs., 1929.

Uropod 1 has marginal spines on the outer ramus. Japan: terrestrial, on a hill in Yu-no-shima, a small island off Asamushi ("about 40° 70′ N"). "This spot is far above the tide marks; and the animals were found living in burrows in soft damp soil under dead leaves."

11. Orchestia malayensis (Tattersall).

Talorchestia malayensis Tattersall: Asiatic Soc. Bengal, Calcutta, Mem., vol. 6, p. 453, figs., 1922.

Orchestia malayensis (Tattersall), Schellenberg: Archiv f. Hydrobiol., Suppl. Bd. 8, "Tropische Binnengewässer Bd. I," p. 502, fig. 2, *o-p,* 1931.

Uropod 1 has no marginal spines on the outer ramus. Singapore: Botanical Gardens, among dead leaves on ground in the shade of trees, on damp walls of drain and on damp earth under logs (type locality; not recorded anywhere else).

Orchestia malayensis (Tattersall) variety *thienemanni* Schellenberg = *O. floresiana* Weber. Stephensen: B. P. Bishop Mus., Bull. 142, art 3, figs. 4-6.

12. Orchestia marmorata (Haswell).

Orchestia marmorata (Haswell), Stebbing: Das Tierreich, Lief. 21, p. 536, 1906.

Uropod 1 not described. Tasmania, on the seashore.

13. Orchestia marquesana Stephensen.

Orchestia marquesana Stephensen: B. P. Bishop Mus., Bull. 142, art 3, figs. 8-10.

14. Orchestia miranda Chilton.

Orchestia miranda Chilton: New Zealand Inst., Trans., vol. 48, p. 354, figs., 1916.

Uropod 1 has marginal spines on the outer ramus. New Zealand: Stephen Island, Cook Strait, on rocky shores.

15. Orchestia montana Max Weber.

Orchestia montana Max Weber: Zool. Ergebn., vol. 2, p. 567, figs., 1892. Stebbing: Das Tierreich, Lief. 21, p. 542, 1906.

Uropod 1 has no marginal spines on the outer ramus. South Celebes: under stones and fallen leaves, altitude 1,150 meters.

16. Orchestia nitida Dana.

Orchestia nitida Dana, Stebbing: Das Tierreich, Lief. 21, p. 539, 1906. Schellenberg: Swedish Antarctic Exped. 1901-1903, vol. 2, no. 6, p. 224, fig., 1931.

Uropod 1 has no marginal spines on the outer ramus. Tierra del Fuego: among floating *Fucus,* on or near the shores; Port Famine.

17. Orchestia parvispinosa Max Weber.

Orchestia parvispinosa Max Weber: Zool. Ergebn., vol. 2, p. 566, figs., 1892. Stebbing: Das Tierreich, Lief. 21, p. 541, 1906. Schellenberg: Swedish Antarctic Exped. 1901-1903, vol. 2, no. 6, p. 502, 1931.

Uropod 1 has marginal spines on the outer ramus. Java: Mount Salak, altitude 1,575 meters, under stones and decaying timber; type locality; 3 places, up to 2,000 and 2,400 meters, in a fountain and a waterfall (Schellenberg).

Not *O. parvispinosa* Chilton (10); according to Schellenberg (30) = *O. malayensis* (Tattersall) variety *thienemanni* Schellenberg.

18. Orchestia pickeringi Dana.

Orchestia pickeringi Dana, Stebbing: Das Tierreich, Lief. 21, p. 538, 1906.

Uropod 1 has no marginal spines on the outer ramus. Hawaiian islands: up to 2,000 feet (35, p. 528); Dana's type specimens were from Kauai or Oahu, "Sandwich islands," without further comments. California, New South Wales, among decaying seaweed, etc.

O. pickeringi Dana is considered synonymous with *O. platensis* Kroyer, species no. 19, by Chilton (15, p. 538), but not by later authors.

19. Orchestia platensis Kroyer.

Orchestia platensis Kroyer, Stebbing: Das Tierreich, Lief. 21, p. 540, 1906. Chevreux and Fage: Faune de France, no. 9, p. 276, figs., 1925. Schellenberg: Deutsche Südpolar-Exped. 1901-1903, vol. 18, (Zool. vol. 10), p. 371, 1926. Schellenberg: Zool. Soc. London, Trans., pt. 5, p. 658 (literature and synonymy), 1928. Barnard: South African Mus., Ann., vol. 15, pt. 3, p. 218 (literature and synonymy), 1932.

Uropod 1 has no marginal spines on the outer ramus. Widely distributed in the Atlantic and adjacent waters, along the shores (2), but also recorded from several places in the Indo-Pacific Ocean. India, Chilka Lake, brackish water, on the shore, very abundant (15, p. 538, figs.). Maldive Archipelago, Mahlosmadulu Atoll, 20 fathoms (?) (48, p. 924, fig.). The depth, 20 fathoms, is possibly not correct (15, p. 540). Bali, Batur Lake, 1,031 meters, frequent on the shore under stones, etc. (29, p. 503, figs.). Tuamotus, South Marutea (about 20° S., 135° W.), the lagoon, on the sandy beach. Mangareva, Taravai, east coast (6, p. 494, figs.). Hawaiian islands, several localities, up to 2,000 to 3,000 feet (35, p. 527).

Recorded with some doubt from the New Hebrides, 6,000 feet (44, p. 96), but as stated by Schellenberg (31, p. 63), the specimens can not belong to the species in question, for they are recorded to have marginal spines on the outer ramus of uropod 1. Possibly the specimens could belong to the species *O. parvispinosa* Weber?

20. Orchestia selkirki Stebbing.

Orchestia selkirki Stebbing: Das Tierreich, Lief. 21, p. 538, 1906.

Uropod 1 has marginal spines on the outer ramus. Juan Fernandez, on the shore.

A valid species (30, p. 224), not identical with *O. chiliensis* Milne-Edwards as suggested by Chilton (14, p. 83).

21. Orchestia serrulata Dana.

Orchestia serrulata Dana, Stebbing: Das Tierreich, Lief. 21, p. 535, 1906. Stephensen: Vid. Meddel. Dansk Naturh. Foren., Copenhagen, vol. 83, p. 347, 1927.

Uropod 1 has marginal spines on the outer ramus. New Zealand, Auckland and Campbell Islands, among seaweed and under stones between tide marks.

Probably *O. serrulata* Dana = *O. chiliensis* Milne-Edwards (14, p. 82, figs.); possibly = *O. aucklandiae* Bate.

22. Orchestia traskiana Stimpson.

Orchestia traskiana Stimpson, Stebbing: Das Tierreich, Lief. 21, p. 534, 1906.

Uropod 1 has marginal spines on the outer ramus. San Francisco, among the rejectamenta along highwater mark.

23. Orchestia tucurauna F. Müller.

Orchestia tucurauna F. Müller, Stebbing: Das Tierreich, Lief, 21, p. 534, 1906. Chilton: Ann. Mag. Nat. Hist., 9th ser., vol. 3, p. 376, 1919, seq., figs., with literature, including the following synonyms: *O. sulensoni* Stebbing (36, p. 541), and (?) *O. dentata* Filhol (36, p. 537).

Uropod 1 has marginal spines on the outer ramus. South Brazil (type locality), ? Madeira (36). New Zealand: banks near the mouth of the Waitohi stream at Picton (13); Chatham Island (19, p. 318); Kapiti Island (?) (Cook Strait; Filhol). According to Chilton's figure (13, p. 5) of pereiopod 1 ("gnathopod 1") of the female which has no palm, the species seems to belong to the genus *Talorchestia.*

Genus TALORCHESTIA Dana

1. Talorchestia antennulata Chevreux.

Talorchestia antennulata Chevreux: Nova Caled. Zool., vol. 2, livr. 1, no. 1, p. 4, figs., 1915.

Uropod 1 has no marginal spines on the outer ramus. New Caledonia: numerous localities, up to 1,600 meters, under decaying leaves. Loyalty Islands: Mare, Raoua.

2. **Talorchestia diemensis** Haswell.

Talorchestia diemensis Haswell, Stebbing: Das Tierreich, Lief. 21, p. 548, 1906.

Uropod 1 not described. New Caledonia, west coast (7, p. 4); Tasmania (Haswell).

3. **Talorchestia gracilis** (Dana).

Talorchestia gracilis (Dana), Stebbing: Das Tierreich, Lief. 21, p. 531, 1906.

Uropod 1 has no marginal spines on the outer ramus. Coral Island in the Balabac Passage (north of Borneo; Dana). North Siam: Lake Tale Sap (17). India: Chilka Lake (15).

T. gracilis (Dana) = *T. martensi* Chilton (15, p. 541) not Weber (49, p. 564, figs.); see Chilton (17, p. 535).

4. **Talorchestia kempi** Tattersall.

Talorchestia kempi Tattersall: Indian Mus., Rec., vol. 8, pt. 5, no. 35, p. 449, figs., 1914.

Uropod 1 has no marginal spines on the outer ramus. Northeast Assam: semi-terrestrial; under stones, and near Sireng stream.

T. kempi Tattersall is near *Orchestia parvispinosa* Max Weber.

5. **Talorchestia limicola** Haswell.

Talorchestia limicola Haswell, Stebbing: Das Tierreich, Lief. 21, p. 547, 1906.

Uropod 1 not described. Queensland: Bowen, in mangrove swamps, under decaying wood, etc.

6. **Talorchestia martensi** (Max Weber).

Talorchestia martensi (Max Weber), Stebbing: Das Tierreich, Lief. 21, p. 553, 1906.

Uropod 1 "not markedly different from those of *Orchestia floresiana*"; outer ramus has no marginal spines. Flores: under stones in and at the margin of the rivulet Lella.

Not *T. martensi* Chilton (15); see Chilton (17, p. 535) = *T. gracilis* Dana.

7. **Talorchestia novaehollandiae** Stebbing.

Talorchestia novaehollandiae Stebbing: Das Tierreich, Lief. 21, p. 553, 1906.

Uropod 1 has marginal spines on the outer ramus. East Australia: Manly Beach.

8. Talorchestia pollicifera (Stimpson).

Talorchestia pollicifera (Stimpson), Stebbing: Das Tierreich, Lief. 21, p. 550, 1906.

Uropod 1 not described. North Pacific: Loo Choo.

9. Talorchestia pravidactyla Haswell.

Talorchestia pravidactyla Haswell, Stebbing: Das Tierreich, Lief. 21, p. 546, 1906.

Uropod 1 has marginal spines on the outer ramus. Tasmania.

10. Talorchestia quadrimana (Dana).

Talorchestia quadrimana Dana, Stebbing: Das Tierreich, Lief. 21, p. 548, 1906.

Uropod 1 has no marginal spines on the outer ramus. Australia: New South Wales; Queensland (Port Denison); on sandy beaches.

11. Talorchestia quoyana (Milne-Edwards).

Talorchestia quoyana (Milne-Edwards), Stebbing: Das Tierreich, Lief. 21, p. 547, 1906. Chilton: New Zealand Inst., Trans., vol. 49, p. 294, figs., 1917.

Uropod 1 has marginal spines on the outer ramus. New Zealand, on sandy beaches.

12. Talorchestia rectimana (Dana).

Talorchestia rectimana Dana: Amer. Acad. Arts and Sci., Proc., vol. 2, p. 203, 1852. U. S. Expl. Exp., vol. 13, p. 877, 1855. Stebbing: Das Tierreich, Lief. 21, p. 543, 1906 (= *Orchestia rectimana, O. tahitensis*). Chevreux: Soc. Zool. France, Mém., vol. 20, p. 495, 1908. Stephensen: B. P. Bishop Mus., Bull. 113, figs., 1935.

Uropod 1 has marginal spines on the outer ramus. Tahiti: various localities, from sea level up to 600 meters, in damp places, under stones. Not known from elsewhere.

13. Talorchestia sinensis Chilton.

Talorchestia sinensis Chilton: China Jour. Sci. and Arts, vol. 3, no. 5, p. 283, figs., 1925.

Uropod 1 not described. China: without special information on occurrence, etc.

14. Talorchestia spinipalma (Dana).

Talorchestia spinipalma (Dana), Stebbing: Das Tierreich, Lief. 21, p. 552, 1906.

Uropod 1 has no marginal spines on the outer ramus. New Caledonia: Noumea (7, p. 4). Tropical Pacific: Tongatabu, about 21° S., 175° W., under seaweed. Queensland: Port Denison, on sandy beach.

15. Talorchestia telluris (Bate).

Talorchestia telluris (Bate), Stebbing: Das Tierreich, Lief. 21, p. 551, 1906. Chilton: New Zealand Inst., Trans., vol. 49, p. 299, figs., 1917.

Uropod 1 has (?) marginal spines on the outer ramus. New Zealand: on sandy shores.

16. Talorchestia tridentata Stebbing.

Talorchestia tridentata Stebbing: Das Tierreich, Lief. 21, p. 546, 1906.

Uropod 1 has no marginal spines on the outer ramus. California: without further information (but found among specimens of *Orchestia traskiana*).

17. Talorchestia tumida G. M. Thomson.

Talorchestia tumida G. M. Thomson, Stebbing: Das Tierreich, Lief. 21, p. 550, 1906. Chilton: New Zealand Inst., Trans., vol. 49, p. 295, figs., 1917.

Uropod 1 has marginal spines on the outer ramus. New Zealand: on sandy beaches, above high-water mark. Chatham Island (19, p. 318).

Talorchestia species, Tattersall.

Talorchestia species, Tattersall: Asiatic Soc. Bengal, Mem., vol. 6, p. 455, 1922.

China: Si Dong Ding, Tai-Hu, under vegetable débris on the shore.

T. japonica Tattersall (43) is probably an *Orchestia*; see *O. japonica* (Tattersall).

Genus PARORCHESTIA Stebbing

The species of this genus have no marginal spines on the outer ramus of uropod 1, except *P. luzonensis* Baker; this is probably an *Orchestia* (see below, species 5).

1. **Parorchestia hawaiiensis** (Dana).

Parorchestia hawaiiensis (Dana), Stebbing: Das Tierreich, Lief. 21, p. 558, 1906.

Hawaiian islands: several localities (Dana; 35, p. 529), terrestrial.

2. **Parorchestia improvisa** Chilton.

Parorchestia improvisa Chilton: Subantarctic islands of New Zealand, vol. 2, p. 641, fig., 1909.

Snares and Stewart Islands east of New Zealand; no record on habits.

3. **Parorchestia insularis** Chilton.

Parorchestia insularis Chilton: Subantarctic islands of New Zealand, vol. 2, p. 639, figs., 1909. Stephensen: Vid. Meddel. Dansk Naturh. Foren., Copenhagen, vol. 83, p. 349, 1927.

Auckland and Campbell islands: under wood, and "extremely abundant right up to the top of the highest hills."

4. **Parorchestia lagunae** Baker.

Parorchestia lagunae Baker: Philip. Jour. Sci., sect. D., vol. 10, p. 254, figs., 1915.

Luzon: Laguna Province, shores of the fresh water lake, Bay Lake, under stones at water margin, only encountered on rocky shores. The pleopods are said to be large and normal.

5. **Parorchestia luzonensis** Baker.

Parorchestia luzonensis Baker: Philip. Jour. Sci., sect. D, vol. 10, p. 253, figs., 1915.

P. luzonensis is probably an *Orchestia*; the maxillipeds have not a 4-joint in the palp (1, pl. 1, fig. 9, p. 253), and uropod 1 has marginal spines on the outer ramus.

Luzon: Laguna Province, summit of Mount Maquiling, altitude 1,060 meters, in the extinct crater, under stones, in dripping mossy forest. The pleopods are described as "not half the size of those of *P. lagunae,* but otherwise normal."

6. **Parorchestia maynei** Chilton.

Parorchestia maynei Chilton: Subantarctic islands of New Zealand, vol. 2, p. 637, figs., 1909. Stephensen: Vid. Meddel. Dansk Naturh. Foren., Copenhagen, vol. 83, p. 349, 1927.

Islands south of New Zealand: Auckland Island, Disappointment Island, Adams Island, under wood, stones, etc., up to 2,000 feet (lower limit not recorded).

7. Parorchestia parva Chilton.

Parorchestia parva Chilton: Subantarctic islands of New Zealand, vol. 2, p. 640, figs., 1909. Stephensen: Vid. Meddel. Dansk Naturh. Foren., Copenhagen, vol. 83, p. 350, 1927.

Auckland Island and Norman Inlet: under logs, etc., sometimes together with *P. maynei.*

8. Parorchestia pusilla Chevreux.

Paarorchestia pusilla Chevreux: Nova Caled. Zool., vol. 2, livr. 1, no. 1, p. 11, figs., 1915.

New Caledonia: in a lake.

9. Parorchestia sarasini Chevreux.

Parorchestia sarasini Chevreux: Nova Caled. Zool., vol. 2, livr. 1, no. 1, p. 8, figs., 1915.

New Caledonia: in forest, altitude 700-1,000 meters.

10. Parorchestia sylvicola (Dana).

Parorchestia sylvicola (Dana), Stebbing: Das Tierreich, Lief. 21, p. 538, 1906.

Uropod 1 has, as in the majority of the species of the genus, no marginal spines on the outer ramus, but some specimens from New Zealand determined by Stebbing, in the Zoological Museum of Copenhagen, have about 4 marginal spines.

New Zealand: from moist soil in the bottom of the extinct volcano of Taiamai far from the sea, and perhaps in other parts; Waihola, Otago, eating into strawberries in a garden (16, p. 90). Chatham Island, Kermadec Island, Lord Howe Island (19, p. 318). "This is the common terrestrial amphipod of New Zealand" (19, p. 318).

11. Parorchestia tenuis Dana.

Parorchestia tenuis Dana, Stebbing: Das Tierreich, Lief. 21, p. 557, 1906. Chilton: Subantarctic islands of New Zealand, vol. 2, p. 642, 1909. Barnard: South African Mus., Ann., vol. 15, pt. 3, p. 226 (literature), 1916. Stebbing: Göteborgs Kungl. Vetensk, Vitt. -Sam. Handl., 4, Följd, vol. 25, no. 1, p. 10, figs., 1922.

New Zealand and Campbell Island; South Africa. On the beach and in a small stream.

CONCLUSIONS

In comparing the Indo-Pacific Talitridae of the genera *Talitrus, Orchestia, Talorchestia,* and *Parorchestia* (tables 1, 2) with those of the Atlantic one notices that:

1. The genus *Talitrus* has only one littoral (Atlantic) species; all the five other species are terrestrial (24, p. 860), and three of these are Indo-Pacific: *T. alluaudi, T. kershawi,* and *T. sylvaticus.*

2. The genus *Orchestia* has about 15 species in the Atlantic and 20 species in the Indo-Pacific area; three of these are common to the two areas (*O. gammarellus, O. platensis,* and *O. tucurauna*). Of the species common to the two areas *O. gammarellus* and *O. platensis* are both littoral (on the shore) and terrestrial (see the list of species, above); *O. tucurauna* lives on the shore or in fresh water. Of the remaining 12 Atlantic species almost all live on or quite near the shore, and a few in fresh water (33, pp. 461-468). No species is found having truly terrestrial habits, but three are occasionally found in places far from seashore. They are:

O. chevreuxi de Guerne (36, p. 533), littoral and terrestrial.

O. bottae Milne-Edwards, possibly = *O. cavimana* Heller (36, p. 534, 8, p. 276, figs.), littoral, etc. Terrestrial, Cyprus, altitude 1,255 meters; Holland, in gardens remote from the sea; Italy, Lago di Garda.

O. grillus (Bosc) (36, p. 540; 32, p. 336). Sometimes in almost dry places.

The Indo-Pacific Ocean has 20 species and 2 varieties or forms (+ the three species common to this ocean and the Atlantic). A few of these 23 (25) species are found in fresh water (33, pp. 461-468), and 10 are found very far from the shore up to great heights above sea level (*O. bollonsi, O. chiliensis* variety *gracilis, O. floresiana, O. floresiana* form *monospina, O. humicola, O. kokuboi, O. malayensis, O. marquesana, O. montana,* and *O. parvispinosa*).

3. The genus *Talorchestia* has 12 species in the Atlantic, probably all living on the seashore. In the Indo-Pacific, the genus has 17 or 18 species, two of which live in fresh or brackish water (*T. gracilis, T. martensi*), and three or four are terrestrial (*T. antennulata, T.* ? *diemensis, T. kempi,* "semiterrestrial," and *T. rectinana*).

Table 2. Species of Terrestrial Genera Recorded from Polynesia.

	Tuamotus	Society Islands	Marquesas	Hawaii	Further Distribution
Talitrus alluaudi	×	—	—	—	Madagascar to Tuamotus
Talitrus sylvaticus	—	—	×	×	Tasmania, Australia
Orchestia floresiana	—	—	×	—	Seychelles to the Marquesas
Orchestia floresiana form monospina	—	—	×	—	Not found elsewhere
Orchestia gambariensis	(×)	—	—	—	Not found elsewhere
Orchestia marquesana	—	—	×	—	Not found elsewhere
Orchestia pickeringi	×	—	—	×	New South Wales; California
Orchestia platensis	×	—	—	×	Widely distributed
Orchestia rectimana	—	×	—	—	Not found elsewhere
Talorchestia spinipalma	(×)	—	—	—	New Caledonia; Queensland
Parorchestia hawaiiensis	—	—	—	×	Not found elsewhere

(×) = littoral

4. The genus *Parorchestia* has only one species in the Atlantic (*P. dassanensis* Barnard, 2), but 11 species in the Indo-Pacific. No less than 9 live far from the sea and are terrestrial (or live in fresh water): *P. hawaiiensis, P. insularis, P. langunae* (fresh water), *P. luzonensis, P. maynei, P. parva, P. pusilla* (fresh water), *P. sarasini,* and *P. sylvicola.*

These four genera together have in the Atlantic (not in the Indo-Pacific) 30 species, of which only 3 (or 4) are found far from the shores; in the Indo-Pacific (not in the Atlantic) about 52 species (+ 2 varieties or forms), about 25 of which are terrestrial. Common to the two oceans are three species, which are all found far from the sea (but also on the seashore).

Thus it is evident that the terrestrial species are characteristic of the Indo-Pacific Ocean. The majority of the terrestrial species live in the forests in the tropical or subtropical zone. One species is known only from hothouses—in Kew Gardens, London, and not found elsewhere, *Talitrus hortulanus* Calman (4)—and one in both hothouses and natural habitats—*Talitrus alluaudi* Chevreux.

Some species of Talitridae with truly terrestrial habits bear the impression of their terrestrial life; Hunt (24, p. 860) has given a record of such characters in the genus *Talitrus.* The most important character is the reduction of the pleopoda, which are quite useless to terrestrial animals. The reduction was, as far as I know, described for the first time in *Talitrus alluaudi* Chevreux (5, p. 389, figs.). Since then, it has been recorded in several other species: *Talitrus kershawi* Sayce, *T. sylvaticus* Haswell, and the other *Talitrus* species (except *T. saltator* Mont. which is a littoral species), *Orchestia floresiana* Max Weber (not very reduced), *O. marquesana* Stephensen, *Talorchestia rectimana* (Dana), *Parorchestia luzonensis* Baker. No doubt the pleopoda are reduced in many more species, but unfortunately the pleopoda of most species are not described. The gills of the anterior pairs of pereiopods are rather large, in the female especially so in pereiopod 2 (7, p. 3). In some species the eyes have been described as more or less reduced: *Orchestia japonica* (Tattersall) (43), and *"Talorchestia parvispinosa"* (10) = *Orchestia malayensis* (Tattersall) variety *thienemanni* Schellenberg (31); in *Orchestia marquesana* Stephensen, they may be, in several cases, quite colorless (in alcohol). Several of the specimens with colorless eyes

were recorded as having been taken under dead leaves; possibly the want of black pigment is a character due to or connected with digging habits, as presumably the specimens do not live on the very surface of the ground, but deeper down (a similar reduction of the eyes is well known in digging terrestrial Isopoda, especially in the family Trichoniscidae). Several other characters are probably connected with terrestrial habits, but the problem has never been studied very thoroughly except in the genus *Talitrus* (24).

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