

A NEW SPECIES OF *DERMANYSSUS* FROM MARINE BIRDS,
WITH OBSERVATIONS ON ITS BIOLOGY
(ACARINA : DERMANYSSIDAE)

BY

Bernard C. NELSON and Deane P. FURMAN¹.

In their revisionary work on the genus *Dermanyssus*, EVANS and TILL (1962) included 12 recognized species all of which parasitize land birds. Subsequently (1964) the same authors described an additional species, *Dermanyssus intermedius*, which possesses some morphological characteristics of the allied genus from mammals, *Liponyssoides* Hirst, 1913. Although this species is intermediate morphologically between the two genera, it occurs on an avian host, as is characteristic of typical members of the genus *Dermanyssus*. MOSS (1966) described *D. gallinoides* from piciform birds. It is closely related to *D. gallinae* (De Geer) and *D. prognephilus* Ewing. The new species described in the present work represents the only species known from sea birds.

Dermanyssus becki Allred, 1957 has the characteristics of the genus *Liponyssoides*, to which genus it is relegated here. It was originally described from species of *Peromyscus* collected in Utah. The present authors have numerous collections of this species taken from Riverside County in southern California from *Peromyscus crinitus stephensi* Mearns and from *Neotoma lepida* Thomas taken in Inyo County and Riverside County, California.

There has been a plethora of systems of nomenclature for the dorsal chaetotaxy of the Mesostigmata in recent years. EVANS and TILL (1965) adequately describe a practical system which they apply to the members of the family Dermanyssidae *sens. lat.* It represents a combination of ATHIAS-HENRIOT's (1957) concept of longitudinal rows for the podonotum with HIRSCHMANN's (1957) system for the opisthonotum. A comparison of the modified system with those of ATHIAS-HENRIOT and HIRSCHMANN is given by LINDQUIST and EVANS (1965). The modified system of EVANS and TILL (1965) is that utilized by the present authors.

1. Graduate Research Assistant and Professor of Parasitology respectively, Division of Parasitology, University of California, Berkeley.

Dermanyssus faralloni sp. nov.

Diagnosis. — Female dorsal shield bearing 12 pairs setae including only 3 of the J series : J 1, 3, 4 ; sternal shield an inverted U shape bearing only 2 pairs setae, the third and fourth pairs arising from unsclerotized cuticula behind the plate ; genito-ventral shield slightly enlarged behind coxae IV then tapered to obtusely pointed posterior margin ; peritreme extending to level of middle of coxa I.

Description.

Female (figs. 2, 4, 5). — Dorsal shield (fig. 4) 810 μ long by 372 μ wide at broadest point at level of anterior one fifth, gradually tapering posteriorly to level of setae J 4, then slightly expanded and truncate posteriorly. It bears 12 pairs of setae. Of the anterior series j 1 and s 1 are off, and z 6 is on the shield. Setae j 4 slightly shorter than z 4 and over 1-1/2 times longer than j 5, j 6 or J setae. Posteriorly the shield bears three pairs of setae, J 1, J 3, J 4 ; J 5 is on integument of dorsum behind dorsal shield. Dorsal integumental setae anteriorly subequal in length to marginal setae of dorsal plate and slightly stouter ; posterior setae slightly reduced in size. Humeral pore on unarmed integument lateral to seta s 4.

On the ventral surface (fig. 5) sternal shield with appearance of a broad inverted U and with indistinct, scale-like sculpturing ; it bears two pairs of acicular setae approximately 65 μ long ; one pair of slit-like pores are visible on the shield between the first and second pairs of setae ; a second pair borders posterolateral margins of shield. Sternal setae 3 and 4 located on unsclerotized cuticula posterolateral to sternal shield ; about 1/3 longer than first two sternal pairs. Genital shield slightly broader behind coxae IV and tapering to obtusely pointed posterior margin ; with pair of genital setae subequal to first sternal setae ; linear sculpturing of genital shield almost inapparent. Anal shield 176 μ long by 159 μ wide at its broadest point ; shape triangular with rounded corners, and with broadest dimension anteriorly. Posteriorly placed anus flanked at midlevel by pair of short (32 μ) adanal setae. The postanal seta is 1/2 length of adanals. Pair of small metapodal platelets situated posterior to coxae IV. Peritremes sinuous, extending anteriorly to level of mid coxae I or further ; peritremal shield fused posteriorly with parapodal plate of coxa IV. Unsclerotized portion of opisthogaster bearing 11 pairs of strictly ventral setae plus approximately 7 pairs of marginal or sub-marginal setae measuring up to 57 μ long ; some marginal setae minutely barbed.

Distal hypostomal setae 44 μ long, longer and stouter than proximal hypostomal and gnathosomal setae. Antero-lateral seta number one of palpal genu expanded and spatulate distally (fig. 2).

Using the formula of EVANS and TILL (1965) the chaetotaxy of the legs is expressed as follows :

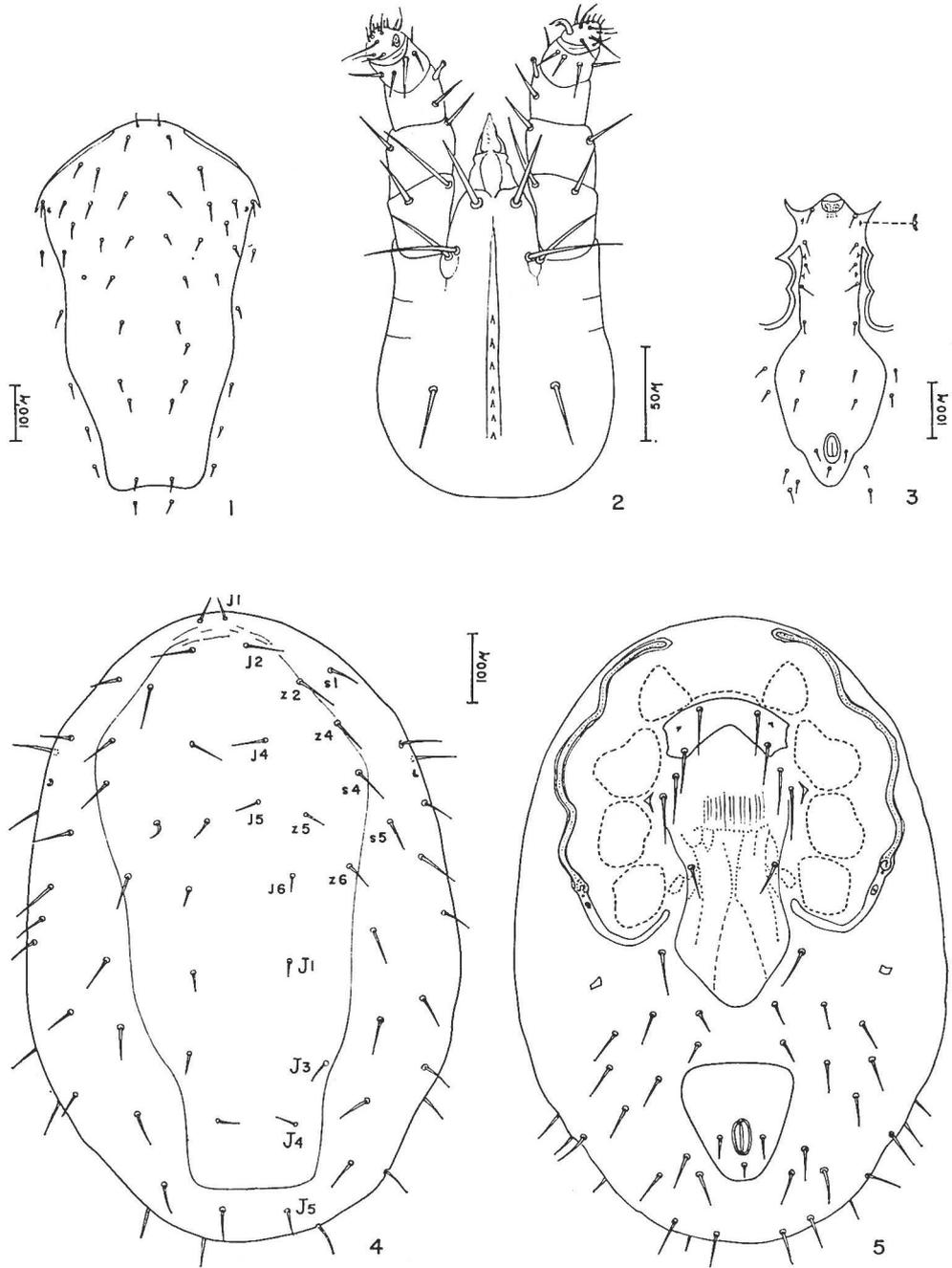


FIG. 1-5. — *Dermanyssus faralloni* sp. nov.

1 — Dorsal shield and adjacent setae of male. 2 — Gnathosoma of female in ventral view. 3 — Holoventral plate and adjacent structures of male. 4 and 5 — Dorsal and ventral views of female.

	I	II	III	IV
coxa	2	2	2	I
trochanter	1 - 1/3 - 1	1 - 0/3 - 1	1 - 1/3 - 0	1 - 1/3 - 0
femur	2 - 5/3 - 2	2 - 5/3 - 1	1 - 3/1 - 1	1 - 3/1 - 1
genu	2-3/2-2/1-2	2-2/1-2/1-2	2-2/1-2/0-2	2-2/1-2/0-1
tibia	2-2/2-2/1-2	1-1/1-2/1-1	1-1/1-2/1-2	1-1/1-2/1-2

Male (figs. 1, 3, 6). — Dorsal shield (fig. 1) 675 μ long by 350 μ wide at the broadest point; shape similar to that of female but relatively broader anteriorly as a result of antero-lateral fusion with peritremal shields; it bears 17 to 19 pairs of setae; in addition to those occurring on the female, pairs j 1, p 2, s 5 and s 6 are on the shield and s 1 is present on one side of the allotype; posteriorly pair J 5 is on the shield and J 2 is present on one side of the allotype; anterolateral setae longer than other dorsal shield setae; medial and posterior setae shorter than setae of unarmed dorsal cuticula. Humeral pore on dorsal shield posterolateral to seta s 4. Setal pattern on unarmed dorsal cuticula similar to that of female.

The holovenral shield (fig. 3) has a reticulated surface and is 555 μ long to base of postanal seta, 113 μ wide at level of sternal seta III and 194 μ wide at level of preanal seta 1. It bears 3 pairs of pores, 4 pairs of sternal setae, one pair of genitals and 2 pairs of preanal setae. Adanal setae situated at mid level of anus, about 20 μ long; postanal seta shorter than adanal pair. Setae of unarmed opisthogaster up to 39 μ long, longer than more anteriorly placed setae and minutely barbed. Metapodal platelets as in female. Peritreme extending to anterior margin of coxa I and on allotype turning dorsal over coxa II; anterior part of peritremal shield fused with dorsal shield at level of posterior 1/4 of coxa II. Anterior endopodal shields fused with holovenral shields to mid level of coxa II and continued posteriorly with parapodal elements of coxae IV.

Tarsi III and IV (fig. 6) bearing a modified ventral seta at level of distal 1/4; its broad base arising from a sclerotized eminence and terminating in a stout, blunt, posteriorly directed-process.

Gnathosoma as in female. Basal segment of chelicera 61 μ long, second segment 98 μ long to tip of short fixed digit; spermatodactyl approximately 98 μ long and with extremity abruptly attenuated.

Deutonymph (figs. 9-10). — Dorsal shield 523 μ long by 258 μ wide at broadest point; shield shape and chaetotaxy pattern as in adult female, but setae j 4, while longer than j 5, j 6 and J setae, are only 5/8 as long as z 4. Chaetotaxy of the dorsal cuticula as in the adult female. Dorsal setae minutely barbed. Sternal shield extending from level of anterior margins of coxae II tapering to a pointed posterior extremity slightly behind level of posterior margins of coxae IV; bearing 5 pairs of marginal setae as illustrated (fig. 10); first pair of sternal setae lon-

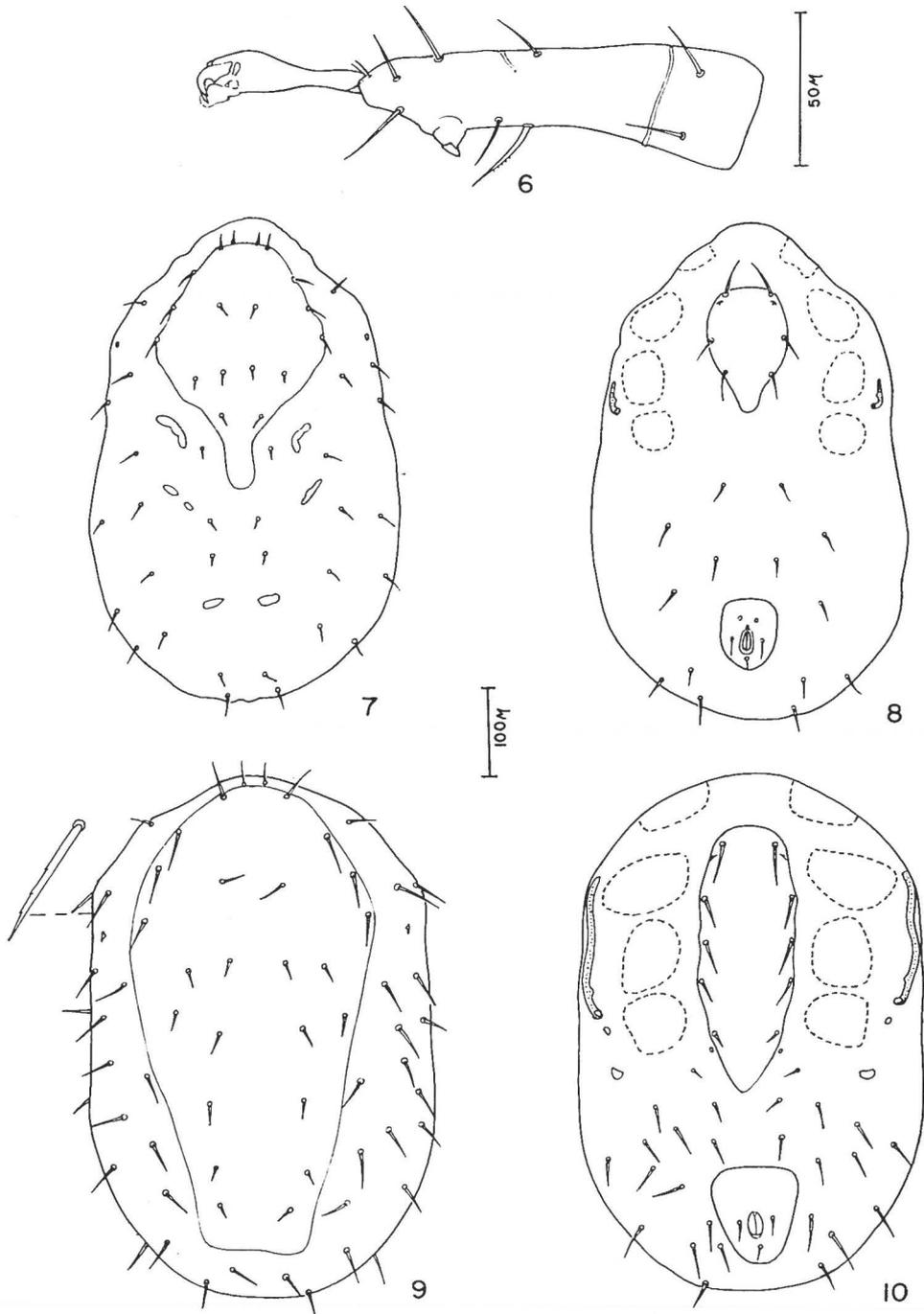


FIG. 6-10. — *Dermanyssus farallonii* sp. nov.
6 — Tarsus IV of male. 7 and 8 — Dorsal and ventral views of protonymph.
9 and 10 — Dorsal and ventral views of deutonymph.

gest; the fifth, or genital pair, shortest. Anal shield and metapodal platelets similar to those of adult female. Peritremes sinuous, extending to level of mid coxae II. Unsclerotized cuticula of opisthogaster bearing 11 to 12 pairs of strictly ventral setae plus 5 to 7 marginal pairs measuring up to 43 μ long and minutely barbed. Gnathosoma similar to that of adult female.

Protonymph (figs. 7-8). — Podonotal shield approximately 365 μ long, but somewhat variable; greatest width 218 μ at level of setae s 3; posterior tip narrowly attenuated, extending well behind setae J 1 but not reaching level of J 3. It bears 8 pairs of setae excluding j 1. Pair of humeral pores on unarmed integument posterolateral of setae s 4. The dorsum bears 3 to 4 pairs of scutellae; three pairs are mesonotal and one pair is pygidial in position, the first pair largest and flanking the posterior attenuation of the dorsal shield. In some specimens mesonotal scutellae 2 and 3 are fused to form a single platelet. Setae J 2 are absent but pairs J 1, 3, 4 and 5 arise from unsclerotized cuticula, as do the complete series Z 1 through Z 5. Sternal shield of a broadly elongate oval shape, attenuated and narrowly rounded posteriorly, bearing three pairs of marginal setae; first pair of sternal setae longer than second and third pairs and appreciably longer than those of notum. Unarmed region of opisthogaster bearing 5 pairs of strictly ventral, fine setae; several pairs of marginal setae may appear either dorsal or ventral in position. Distal pair of hypostomal setae stouter than proximal hypostomal setae.

Collection records. — *Oceanodroma homochroa* (Coues): Holotype female, 4 paratype females, 4 paratype deutonymphs and 11 paratype protonymphs, 7-10 July, 1964 from South Farallon Island, California, collector A. G. MARSHALL; 7 paratype females, 3-10 July, 1965 from South Farallon Island, California, collector W. A. FOSTER. *Cepphus columba columba* Pallas: 7 paratype females, 7-10 July, 1964 from South Farallon Island, California, collector A. G. MARSHALL. *Ptychoramphus a. aleutica* (Pallas): allotype male and 2 paratype females, August, 1959 from Farallon Island, California, collector A. C. THORESEN. Holotype, allotype and 3 paratypes deposited in the collections of the U. S. National Museum. Paratypes deposited in the British Museum (Natural History), the Institute of Acarology, Wooster, Ohio, and in the California Insect Survey Collection, University of California, Berkeley.

Systematic position. — The new species is closely related to *D. hirundinis* (Hermann). The latter species differs from *D. farallonii* in the following characteristics of the female: peritreme of female extending only to mid-level of coxa II; anal plate roughly egg-shaped; dorsal shield of female smaller, only 670 μ long; setae z 6 off the dorsal plate; genital shield broadly rounded posteriorly.

Observations on biology. — All collections of the new species were made on the Farallon Islands, located approximately 27 miles west of San Francisco, California.

Climate of the islands is moderate with temperatures varying from 6° to 24.5° C during the year. Foggy weather is common, and the annual precipitation of 9 to 10 inches normally occurs between late December and April.

Of the 12 species of breeding sea birds and three species of breeding passerines mentioned by BOWMAN (1961) as inhabitants of South Farallon Island, only three are known as hosts for *D. faralloni*: Ashy Petrel (*Oceanodroma homochroa*), Cassin's Auklet (*Ptychoramphus a. aleutica*) and Pigeon Guillemot (*Cepphus columba columba*). Each of these birds requires cover for its nesting sites. Ashy Petrels nest in crevices between rocks, under debris and buildings, in stone walls (BOWMAN, 1961; JAMES-VEITCH, pers. comm.) and in vacated Auklet burrows (THORESEN, 1964). Cassin's Auklets excavate burrows from two to five feet in depth but use holes or crevices between rocks where the soil is shallow or absent (THORESEN, 1964). Pigeon Guillemots, which are extremely plastic in their selection of nesting sites, use natural holes or crevices, excavate burrows or, rarely, use open ledges (DRENT, 1965). On the Farallons guillemots were observed nesting in rocky crevices, in burrows of European Rabbits (*Oryctolagus*) and under railroad ties (BOWMAN, 1961). Two other species of sea birds, *Oceanodroma leucorhoa beali* (Leach's Petrel) and *Lunda cirrhata* (Tufted Puffin), nest in rocky crevices or burrows (BOWMAN, 1961). The "open" type of nest is employed by the remaining seven species of breeding sea birds. *D. faralloni* was not collected from adults, young or nests of any of these seven species. Thus it seems that *D. faralloni* prefers birds using a covered nesting site. This species is apparently a nest inhabitant rather than permanently ectoparasitic, and will probably be collected subsequently from nests of Leach's Petrels and Tufted Puffins.

Hosts of *D. faralloni* only come to the Farallons to breed. These species probably spend the remainder of the year in the open sea in the vicinity of the breeding grounds, although there are few data in the ornithological literature concerning their winter activities. The first to return to the Farallons are Cassin's Auklets which arrive in January following the first heavy rains. Territories are set up and burrows are cleaned out or excavated although breeding does not commence until March (THORESEN, 1964). The breeding season is staggered throughout most of the year. Actual and projected records of fully fledged auklets extend from May to October (PAYNE, 1965). Ashy Petrels arrive on the Farallons in late April. JAMES-VEITCH (pers. comm.) recorded an incubation period of 40 to 50 days and a period of fledging of 63 to 81 days. BENT (1922) stated that downy young were present in September. Although residence periods for Pigeon Guillemots are not recorded for the Farallons, DRENT (1965) reported the species arrive on Mandrate Island, British Columbia, in late April and depart early in September. Therefore, *D. faralloni* has access to a host for a period of nearly 10 months of the year. During the remainder of the year European Rabbits, Western Gulls and cormorants are present and may serve as a source of blood meals. Female mites of a related species (i.e., *Dermanyssus gallinae*) have been observed to survive periods of 34 weeks without a blood meal (KIRKWOOD, 1963). In view of

either or both of these factors there seems little danger of *D. faralloni* failing to survive during the absence of its normal hosts.

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