Some Oribatid Mites (Acari: Acariformes) From Mt. Kaala, Oahu

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Mt Kaala (21°31' N, 158°0' W) on Oahu, is the highest point in the island (1225 m). Located on the Waianae Range, it is one of Hawaii's Natural Area Reserves. Rainfall in the area averages 150–225 cm annually, with only 5.0–7.5 cm falling in the driest month and 20–30 cm falling in a wetter winter month (DOFAW 1990). The summit plateau was formed by dense a'a lava flows, remnant from the original volcano that created the Waianae Mountains. The flat-topped summit is dominated by ohia (*Metrosideros polymorpha*) (Myrtaceae), its slopes predominantly covered by mixture of Ohia/Uluhe (*Dicranopteris linearis*) forest; ridge tops predominantly ohia that grades into koa (*Acacia koa*)/Ohia forest. At 600 m, non-native vegetation such as Christmas berry (*Schinus terebinthifolius*) and molasses grass (*Melinis minutiflora*) occupy drier slopes.

The only previous records of oribatid mites from Mt. Kaala are that of *Oribotritia hawaiiensis* Jacot 1934, which consisted of 5 adults, collected by R.C.L. Perkins in April, 1892 (BBM18P) (Jacot 1934) and that of *Phthiracarus dasypus* (Dugès, 1834) (= *Hoploderma dasypus* Dugès) (Pearce 1910, Nishida 1994). Data on the latter species did not include date and name of collector, but it would be a reasonable presumption that this was also collected by Perkins.

On 10 October 1989, a sample of sphagnum-like moss with some soil attached to the root system was taken at the summit (1225 m). At ca. 500 m, *Casuarina* litter on disturbed habitat along the road was sampled. Fog and heavy rain at the summit characterized the area at the time of sampling whereas at 500 m, the rain had stopped leaving only moistened soil and litter. Each sample was approximately 2 hands full.

Oribatid mites were extracted using Tullgren-Berlese funnels. Mesostigmata (8–12% of total mite individuals) and Prostigmata (5–7%) were either mounted on slides or kept in the acari alcohol collection at the J. Linsley Gressitt Center for Research in Entomology, Bishop Museum for future studies. Sincere thanks to Mr. David G. Smith, Department of Land and Natural Resources, Division of Forestry and Wildlife, for his kind assistance in the field.

Results and Discussion

The dominance of oribatid mites in *Sphagnum* moss and in soil and litter on Mt. Kaala, Hawaiian Islands, supports previous findings on the predominance of oribatids in said habitats (Norton 1990). From *Sphagnum* moss, 1078 oribatid specimens (81% of total mites) were collected whereas from *Casuarina* litter, 990 individuals (88%) were recovered. The oribatids recovered represent 14 superfamilies, 17 families, 19 genera, and 29 species. Six families, 10 genera, and 15 species are new records for the Hawaiian islands. A possible new genus near *Dometorina* (Scheloribatidae) was among the interesting oribatid taxa recovered (Table 1).

No oribatid mites were common to both samples. However, notable differences in composition of taxa were observed, for example, members of the family Phthiracaridae, a family in the Macrophylina group (Oribatei "Inferiores"), comprised 56% of the oribatid

Table 1. Oribatid taxa on Mt. Kaala, Oahu Island, Hawaiian Islands.

Taxon	1225 m elev. *Sphagnum* moss	500 m elev. *Casuarina* litter
ARCHEONOTHROIDEA		
Ctenacaridae *		
Ctenacarus araneolus (Grandjean, 1932)*		x
PHTHIRACAROIDEA		
Phthiracaridae		
Atropacarus cf. *striculus* (Koch, 1835)*	x	
Phthiracarus sp.	x	
EUPHTHIRACAROIDEA		
Oribotritiidae		
Oribotritia cf. *hawaiiensis* Jacot	x	
Euphthiracaridae		
Microtritia cf. *minima* (Berlese, 1904)	x	
NANHERMANNIOIDEA		
Nanhermanniidae*		
Nanhermannia sp.*	x	
HERMANNIELLOIDEA		
Hermanniellidae*		
Hermanniiella sp.*	x	
DAMAEOIDEA		
Damaeidae*		
Damaeus sp.*	x	
CEPHEOIDEA		
Cepheidae		
Cepheus sp.	x	
MICROZETOIDEA		
Microzetidae		
Berlesezetes cf.*auxiliaris* Grandjean, 1936*		x
CARABODOIDEA		
Otocepheidae		
Dolicheremaeus sp.		x
OPPIOIDEA		
Oppiidae		
Microppia minus (Paoli, 1908)*		x
Three undetermined species		x
Suctobelbidae*		
Suctobelba sp.*		x
ORIPODOIDEA		
Scheloribatidae		
Scheloribates nr. *indicus* Jacot, 1934		x
Scheloribates nr. *muiri* Jacot, 1934		x
Scheloribates n. sp.*	x	
Scheloribates (Protoscheloribates) sp.		x
Scheloribates (s.s.) nr. *oahuensis* Jacot, 1934		x
new genus near *Dometorina**	x	
Haplozetidae		
Xylobates cf. *capucinus* (Berlese, 1908)*	x	
Rostrozetes sp.*		x
CERATOZETOIDEA		
Ceratozetidae		
Fuscozetes sp.*	x	
ACHIPTERIOIDEA		
Achipteriidae*		
Achipteria sp.*	x	
GALUMNOIDEA		
Galumnidae		
Galumna fordi Jacot, 1934.		x
Galumna hawaiiensis Jacot, 1934		x
Galumna sp.	x	

* **New state record**

summit sample but was absent from the *Casuarina* sample. On the other hand, *Ctenacarus araneolus* (Grandjean 1932), a species belonging to the ancestral group Palaesomata and whose distribution is confined to the Neotropical and Holarctic regions (Marshall *et al.* 1987) was reported from *Casuarina* litter. Not finding a single taxon common to both samples could be attributed to the habitat type, food source and abiotic factors such as moisture and temperature. The oribatids found at the summit were most likely associated with *Sphagnum* moss, whereas species on soil and litter probably derived their food from the habitat either as saprophages or mycophages. Comprehensive samplings of different habitats are needed to ascertain natural patterns of oribatid distribution in Mt. Kaala and other areas of the Hawaiian Islands. It is noteworthy that it took approximately 100 years after Perkins' original collections before another oribatid mite or any mite was collected from Mt. Kaala.

The incredible diversity of oribatids from a single locality and from two meager samples suggests the numerical and environmental importance of this group in the soil ecosystem that might be exploited in future reserve or park management and conservation programs as ecological indicators of soil biotopes and as indicators of effects of human and animal activities on terrestrial ecosystems.

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New Records of Copepods (Copepoda) from Oahu, Hawaii

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Results of a terrestrial invertebrate survey pilot project along the Schofield-Waikane Trail on Oahu in 1989 resulted in the discovery of copepods collected in elevated cup traps in ohia and koa trees along the trail. Two of the 3 species, identified by J. Reid of the National Museum of Natural History, Smithsonian Institution, Washington, D.C. (NHNM), are new records to the fauna of copepods in Hawaii. Vouchers of all 3 species are in the Bishop Museum (BPBM).