

Rhyssa lineolata (Kirby) (Hymenoptera: Ichneumonidae: Pimplinae)

A Species New to New Zealand

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SYNOPSIS

A species of *Rhyssa* previously not known to be established in New Zealand, and identified as *Rhyssa lineolata* (Kirby), was discovered in two exotic forests in the Hawke's Bay area in 1958. This American species is parasitic on *Sirex noctilio* (F.) and is useful for the biological control of this insect. An outline is given of the differences between *R. lineolata*, *R. persuasoria* (L.), and the native *Certonotus fractinervis* (Vollenhoven).

On November 25, 1958, a female of an unusual *Rhyssa* species was captured by M. A. Stoodley, Forest Biology Observer, in Esk Forest. This insect was found on a *Pinus radiata* D. Don. During the following month a second female specimen was caught by R. L. Cornwell, Forest Ranger, in the office of Gwavas Forest. One specimen was handed over to the Forest Research Institute by Mr. Stoodley, and in February, 1959, this specimen was forwarded to the Commonwealth Institute of Entomology for identification. In reply J. F. Perkins, of the British Museum staff, stated that the specimen agreed best with *Rhyssa lineolata* (Kirby), but that there was inadequate material in the museum collection to be able to differentiate between this North American species and the European *Rhyssa amoena* Grav. A request was made for males since these should show more distinctive differences than the females.

In September, 1959, a small number of *Pinus radiata* logs containing *Rhyssa* larvae, and already showing siricid exit holes, was collected from Esk and Gwavas Forests (Hawke's Bay) and placed in the Forest Research Institute insectary. From these logs enough specimens for identification of the then undetermined *Rhyssa* sp. were obtained by the end of November, and it was expected that more would emerge from this source.

On December 3, 1959, a number of males and females of the *Rhyssa* sp. were sent to the Commonwealth Institute of Entomology. These were examined by Mr. Perkins, but as he was unable to decide whether they belonged to an American or to a Japanese species, they were forwarded to Dr. H. K. Townes in the United States for identification. In the opinion of Dr. Townes "the *Rhyssa* is identical with the western race of *Rhyssa lineolata* Kirby. Western specimens have the white orbital mark interrupted above, while specimens from the east usually have it complete. I would

suppose that the stock came from the Vancouver area."

Whether or not the stock did come from the Vancouver area is uncertain, since a re-examination of the material at the Forest Research Institute has shown several specimens to have an uninterrupted orbital mark. Presumably *R. lineolata* entered the country in imported timber and was in this way accidentally introduced. There are no records of any *Rhyssa* species other than *R. persuasoria* (L.) having been introduced for the biological control of *Sirex noctilio* (F.).

R. lineolata is distributed transcontinentally in Canada and in the Transition Faunal Zones of the United States (Muesebeck, *et al.* 1951, p. 200). Essig (1946, p. 796) gives its distribution as boreal North America, and Colorado, Washington, and British Columbia in the west, Thompson (1957, p. 539) as United States. The following hosts are recorded (Muesebeck *et al.*): *Serropalpus* sp., *Monochamus scutellatus* (Say), *M. titillator* (F.), *Phymatodes dimidiatus* (Kby.), *Sirex edwardsii* Br., *Urocerus albicornis* (F.), *U. cyaneus* (F.), *Xeris* sp. The introduction into New Zealand of one of these hosts of *R. lineolata* cannot at present be ruled out, although none of the above species emerged from the logs from Esk and Gwavas Forests. Experiments at the F.R.I. in which *Rhyssa lineolata* oviposited on *Sirex noctilio* larvae in logs of *Pinus radiata* and *Pinus patula* Schlecht. and Cham. have proved that *R. lineolata* parasitises *Sirex noctilio*.

R. lineolata can be distinguished from *R. persuasoria* by the antennae having a pale band past the middle. Both males and females have this characteristic, but in the male the band is narrower (see Fig. 1 and 2). The European *R. amoena* also has this pale band. An ichneumonid of similar size to *R. lineolata* which occurs in New Zealand is the native *Certonotus fractinervis* (Vollenhoven) formerly known as *Rhyssa fractinervis* Vollenhoven.* In this species the tips of the antennae are yellow, while the body is brown with yellow markings; *R. lineolata* and *R. persuasoria* are black with white markings. A species described by Colenso in 1885 under the name of *Rhyssa clavula* appears to be *C. fractinervis*. Colenso's specimen has not been seen by the authors but the description tallies with the specimens of *C. fractinervis* at the Forest Research Institute.

The number of insects which emerged from the *P. radiata* logs collected in September, 1959, in Esk and Gwavas Forests is given in Table I. Emergences from October 11, 1959, to March 26,

* Mr. A. W. Parrott, Nelson, allows it to be stated that he has in manuscript a redescription of *Rhyssa fractinervis* and is placing this species in its correct systematic position in the genus *Certonotus*, tribe Labenini. The manuscript is to be published at some later date in connection with work on Australian Ichneumonidae. He has also confirmed that *Rhyssa clavula* is a synonym of *Certonotus fractinervis*.

TABLE I.

Number of *Rhyssa lineolata*, *Rhyssa persuasoria*, *Guiglia schauinslandi* and *Sirex noctilio* which emerged during the period October 11, 1959 to March 26, 1960, from *Pinus radiata* logs collected in Esk and Gwavas Forests.

Week Ending	Logs From Esk								Logs From Gwavas*							
	R. lin.		R. pers.		G. schau.		S. noct.		R. lin.		R. pers.		S. noct.			
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females		
1959																
17 Oct.	—	—	11	—	—	—	—	—	—	—	8	—	—	—		
24 Oct.	—	—	13	—	—	—	—	—	—	—	7	—	—	—		
31 Oct.	12	—	15	2	—	—	—	—	—	—	1	—	—	—		
7 Nov.	18	—	16	2	2	—	—	—	6	—	6	—	—	—		
14 Nov.	37	2	8	9	2	—	—	—	58	2	2	1	—	—		
21 Nov.	78	2	5	15	6	1	—	—	123	3	—	—	—	—		
28 Nov.	31	6	3	7	4	—	—	—	69	2	1	1	—	—		
5 Dec.	20	13	3	4	6	1	—	—	64	7	—	2	—	—		
12 Dec.	5	18	2	2	2	1	—	—	43	31	1	—	—	—		
19 Dec.	3	27	—	6	1	—	—	—	9	79	2	—	—	—		
26 Dec.	1	18	—	5	2	1	—	—	5	80	—	—	—	—		
1960																
2 Jan.	—	16	—	4	—	3	—	—	1	49	—	—	—	—		
9 Jan.	2	11	—	2	—	2	7	—	1	13	—	—	—	—		
16 Jan.	—	5	—	1	—	1	51	1	—	12	—	—	2	—		
23 Jan.	—	2	1	—	—	—	47	12	—	6	—	—	2	—		
30 Jan.	—	2	—	1	—	—	167	19	—	6	—	—	23	3		
6 Feb.	—	—	—	1	—	—	22	2	—	2	—	—	6	1		
13 Feb.	—	—	—	—	—	—	109	14	—	—	—	—	9	2		
20 Feb.	—	—	—	—	—	—	67	15	—	2	—	—	2	4		
27 Feb.	—	—	—	—	—	—	17	3	—	—	—	—	3	2		
5 Mar.	—	—	—	—	—	—	11	2	—	—	—	—	2	2		
12 Mar.	—	—	—	—	—	—	32	17	—	—	—	—	13	2		
19 Mar.	—	—	—	—	—	—	2	2	—	—	—	—	1	1		
26 Mar.	—	—	—	—	—	—	23	15	—	—	—	—	4	1		
Totals	207	122	77	61	25	10	555	102	379	294	28	4	67	13		
Grand Totals Esk and Gwavas logs	586	416	105	65	25	10	622	120	* No <i>Guiglia schauinslandi</i> emerged from these logs.							

1960, are given by weekly totals. It can be seen from this table that by the middle of December most of the males of *R. lineolata* had emerged, whilst the greatest number of females emerged after this period. A large number of males were kept in cool storage at 4° - 6° centigrade. When females emerged several of these males

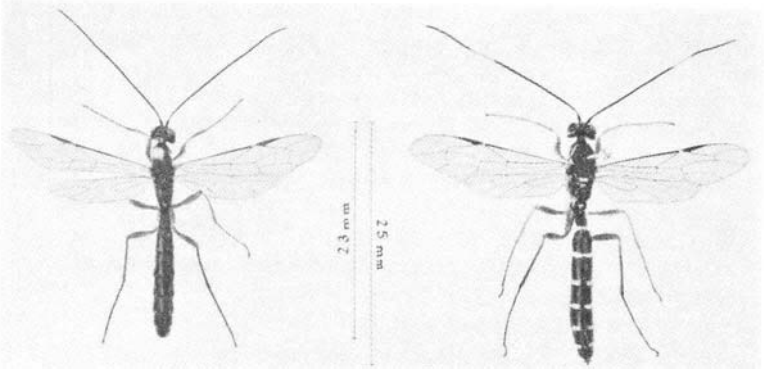


FIG. 1.-Males of *Rhyssa persuasoria* (at left) and *Rhyssa lineolata*.

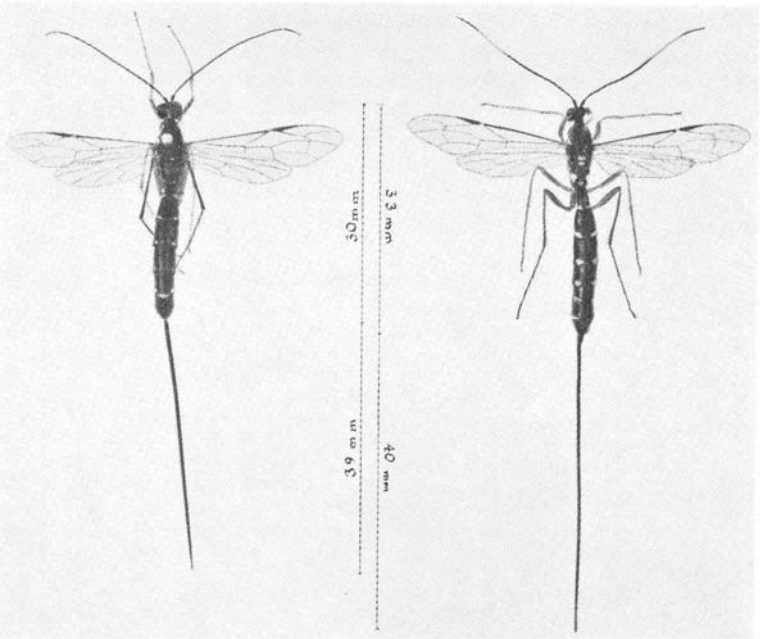


FIG. 2.-Females of *Rhyssa persuasoria* (at left) and *Rhyssa lineolata*.

were placed with them in small observation cages or in the insectaries. Mating was observed in both cases but did not occur readily.

The figures in the table give some indication of the usefulness of *R. lineolata* as a parasite of *S. noctilio* in Esk and Gwavas Forests. The total emergence from the logs of 586 males and 416 females of *R. lineolata*, which greatly outnumbered the 105 males and 65 females of *R. persuasoria*, indicates a higher degree of parasitism by *R. lineolata* even though *R. persuasoria* has been established in New Zealand for 30 years. However, the possibility that *R. lineolata* may have hyper-parasitised *R. persuasoria* cannot be ignored. The degree of parasitism of *S. noctilio* was not determined as the number of siricid exit holes was not counted after collection of the logs.

In December, 1959, 26 males and 31 females of *R. lineolata* were released in Waitangi Forest (North Auckland), and breeding is being undertaken at the Forest Research Institute to enable further releases to be made in other forests.

The study of *R. lineolata*, its effectiveness as a parasite of *S. noctilio*, and its relationship with other species which parasitise *S. noctilio* will be continued in subsequent years.

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