Differentiation between the larvae of *Resseliella piceae* and *R. skuhravyorum* (Diptera: Cecidomyiidae)

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Abstract: Morphological differences between larvae of *Resseliella piceae* and *R. skuhravyorum* are given and discussed. *Resseliella skuhravyorum*, from cones of *Larix decidua*, was recorded in The Netherlands for the first time in 1989. *Resseliella piceae* was already reared in 1980 from cones of *Abies alba* in The Netherlands, but has not been reported before as a new species for the Dutch fauna.

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Introduction

During a survey of cone and seed insects in July 1989, cecidomyiid larvae were found in cones of *Larix decidua* Mill. collected in the seed orchard of the State Forestry Service at Vaals, The Netherlands (Grijpma & Van de Weerd, 1991). The larvae obviously belonged to the genus *Resseliella* (Seitner, 1906) but an attempt of the last two authors to identify the larvae at the species level on the basis of the original descriptions given by Seitner (1906) for *R. piceae* in cones of *Abies alba* Mill. and by Skrzypczyńska (1975) for *R. skuhravyorum* in cones of *Larix decidua* and *L. polonica* Rac. failed. This was mainly due to the little detailed description of *R. skuhravyorum*-larvae by Skrzypczyńska and the use of a different terminology by Seitner (1906) for the description of the terminal papillae of the anal segment in *R. piceae*-larvae. To remedy this, the last two authors, in cooperation with the author of *R. skuhravyorum* decided to provide a more detailed description of certain morphological elements of the larvae of both species.

Until now, *R. piceae* has only been found in cones of fir species (*Abies alba, A. nordmanniana* (Stev.) Spach and *A. cephalonica* Loud.) (Postner, 1982) whereas *R. skuhravyorum* has been found only in cones of larch species (*L. decidua* and *L. polonica*) (Skrzypczyńska, 1975). Both species feed on the seeds inside the cones and may cause losses of up to 60 percent of the seeds (Postner, 1982). In The Netherlands, *R. piceae* (Nijveldt det.) was collected for the first time by the last author in cones of *A. alba* on 2 September 1980 at De Hoge Veluwe (Province of Gelderland). Some specimens were deposited in the collection of the Museum of Natural History in London.

Materials and methods

The length and width of 35 mature (exited) larvae of *R. skuhravyorum* collected from cones of *L. decidua* in Nevache, France (n = 6) and Vaals, The Netherlands (n = 29) and of 100 larvae of *R. piceae*, collected from cones of *A. alba* in the Sadecki Beskid Mountains, Poland, were measured. All larvae had been preserved in a solution of 70-75% ethanol. In addition, 10 microscopic preparations were made of mature larvae of each species; in these preparations, the length of the spatula sternalis and the distance between the sclerotized terminal papillae (claws) of the anal segment were measured.

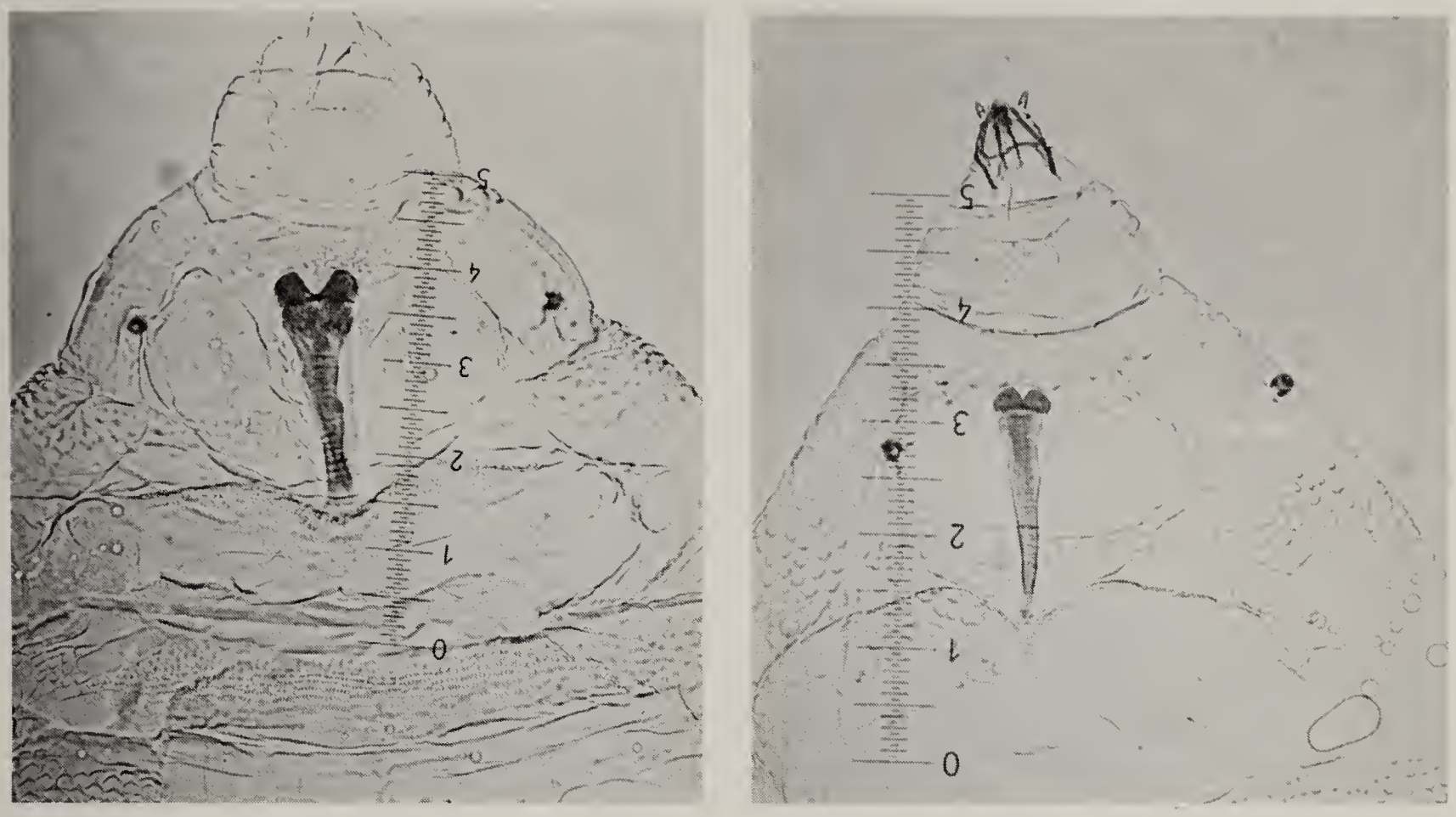

Fig. 1. Sternal spatulae of *Resseliella piceae* (left) and *R. skuhravyorum* (right). 1 Scale unit = 0.1 mm.

Results

No significant differences were found in the length and width of *R. skuhravyorum*-larvae collected in France and The Netherlands. Larvae from France had an average length of 3.55 mm (range 3.12-3.90 mm) and a width of 0.80 mm (range 0.65-0.91 mm) whereas larvae from The Netherlands had a length of 3.28 mm (range 2.60-4.16 mm) and a width of 0.71 mm (range 0.52-0.91 mm). The pooled results of these measurements are presented in table 1. Mature larvae of *R. piceae* are longer and broader than those of *R. skuhravyorum* (table 1). The sternal spatula of both species is bilobed and varies within each species as far as size and form is concerned. In general, however, the spatula is larger in *R. piceae* than in *R. skuhravyorum* (table 1). As a rule, the lobes of the spatula are more pronounced and stand wider apart in *R. piceae* than in *R. skuhravyorum* (table 1; fig. 1). The anal segment of the larvae of both species possesses 8 terminal papillae. Of these, two have developed into large sclerotized processes or claws, while the other three pairs bear a short seta.

Table 1. Morphological and host differences between larvae of *R. skuhravyorum* and *R. piceae*.

	Resseliella skuhravyorum	*Resseliella piceae*
Colour:	orange, shiny	rose to reddish, shiny
Length:	3.31 mm (range 2.60-4.16 mm; n = 35)	5.09 mm (range 4.42-5.58 mm; n = 100)
Width:	0.72 mm (range 0.52-0.91 mm; n = 35)	1.01 mm (range 0.78-1.43 mm; n = 100)
Sternal spaluta:	bilobed; lobes less developed; average spatula length: 0.19 mm (range 0.16-0.23 mm; n = 10)	bilobed; lobes more pronounced, wider apart; average spatula length: 0.30 mm (range 0.28-0.33 mm; n = 10)
Anal segment:	with 8 terminal papillae sclerotized claws closer together average distance between claws: 102.7 µm (range 75-136 µm; n = 10)	with 8 terminal papillae sclerotized claws wider apart average distance between claws: 147.5 µm (range 122-170 µm; n = 10)
Host:	cones of *Larix decidua, L. polonica*	cones of *Abies alba, A. nordmanniana* and *A. cephalonica*

Fig. 2. Anal segments of *Resseliella piceae* (left) and *R. skuhravyorum* (right). Arrows indicate the location of 3 of the 6 setae-bearing terminal papillae. 1 Scale unit = 0.1 mm.

Although no significant differences in shape or in the location of the 6 seta-bearing papillae could be detected between the species, major differences were noticed between the pairs of sclerotized claws. In *R. piceae*-larvae, the claws stand wider apart from each other and are as a rule, more blunted than in *R. skuhravyorum* (table 1; fig. 2). A summary of the most prominent differences between the two species is given in table 1.

Discussion

In her description of *R. skuhravyorum*, Skrzypczyńska (1975) indicated that the larvae of the new species differed from *R. piceae* with respect to the spatula sternalis and the shape of the terminal papillae of the anal segment. However, these differences were not further specified, which resulted in some confusion when the last two authors found larvae of a *Resseliella* sp. in cones of *L. decidua* in The Netherlands. The length of these larvae agreed more with the length of 3-4 mm indicated by Seitner (1906) for *R. piceae* than the length of 1.9-2.4 mm indicated by Skrzypczyńska (1975) for *R. skuhravyorum*. An explanation for this discrepancy is that the description of *R. skuhravyorum* was partially based on larvae (n = 10) that were not fully mature, as they were collected at the end of June. Mature larvae can usually be collected in the second week of July when they exit from the larch cones. In a posterior publication, which included additional measurements of larvae (n = 30) collected in a large number of localities in Poland (Skrzypczyńska, 1977), an average length of 2.8 mm and a wider range (1.9-3.1 mm) were given; the corresponding average width of the larvae was 0.9 mm (range 0.8-1.0 mm). Based on these data, the larvae of *R. skuhravyorum* in Poland still appear somewhat shorter and broader than those collected in France and The Netherlands. This may be due to geographical variation or to the fact that the Polish larvae were preserved in 75% ethanol, whereas the larvae originating from Nevache, France and Vaals, The Netherlands were kept in a solution of 70% ethanol.

As the shape and length of the spatula sternalis of *R. skuhravyorum* and *R. piceae* (Skrzypczyńska, 1980) may vary and some-

times even resemble each other, these characteristics are less suited for identification. To this end, the shape of the claws and the distance between them, appear to be more reliable criteria.

Literature

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