

The Flax Thrips: *Thrips lini* Lad. or *Thrips linarius* Uzel?

by

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In the Netherlands and surrounding countries a disease occurs in flax which is called "kwade koppen" (bad heads). Until recently it was assumed to be caused exclusively by the adults of the flax thrips which are referred to in the literature as either *Thrips lini* Lad. or *Thrips linarius* Uzel; we have not found other names for this insect. However, in two recent publications it is stated that the "bad heads" can also be brought about by the larvae of the long-winged generation of *Thrips angusticeps* Uzel and by the adults of this generation. Under the present circumstances the larvae of this species play a much greater role in the Netherlands than the adults of the flax thrips, as far as the above-mentioned phenomenon is concerned (FRANSSSEN, 1955; FRANSSSEN & HUISMAN, 1958).

The nomenclature of *Thrips angusticeps*, described in 1895 by UZEL, has never presented any difficulties. However, which should be the right name for the flax thrips? In flax, apart from the two species mentioned, numerous other Thysanoptera are found; this has been reported by nearly all research workers engaged in the study of flax insects. It was also known to PRIESNER (1928) who in his well-known handbook states: „Der Name Flachsfliege" ebenso wie „*Thrips linarius*" ist vielfach nur ein Sammelname, der von Phytopathologen und Flachsbauern für verschiedene, auf *Linum usitatissimum* vorkommende Thysanopteren-Arten gebraucht wurde". (The name flax thrips, like *Thrips linarius*, is more of a collective name which was used by Phytopathologists and flax farmers for various Thysanoptera-species found on *Linum usitatissimum*). DOEKSEN (1938) found 13 species in flax, ERMOLAEV (1940) 7, VON OETTINGEN (1941) 13 and MORISON (1943) 18; the present writers so far have found 25 species in flax.

It should be pointed out that in the Netherlands only adults of *Thrips angusticeps* Uzel, of the flax thrips and of the oat thrips (*Stenothrips graminum* Uzel) occur frequently in flax. All other species are nearly always by far in the minority. The larvae occurring in flax in the Netherlands almost exclusively belong to the species *Thrips angusticeps* Uzel and (or) to the flax thrips. It is possible that the position in France is somewhat different from that in the Netherlands; however, on the whole they will agree.

LADUREAU (1877) at the time also studied the bad heads in flax in France. He came to the conclusion that it was caused by a thrips which he called *Thrips lini*. Apparently LADUREAU thought he had observed only one species which, however, could not have been the case, as will be shown. His descriptions and illustrations of the adults and of the larvae are so incomplete and inaccurate that they could apply to practically any dark coloured thrips. That LADUREAU was very inaccurate is apparent from the fact that the species described by him would

have antennae consisting of five segments, while the antennae of the representatives of the genus *Thrips* always consist of seven segments. Thysanoptera with antennae consisting of five segments do not occur in flax in Central Europe, at least when monstrosities are left out of consideration.

Fortunately LADUREAU described some phenological and biological properties of the larvae which he observed in flax and from these descriptions it can be concluded with certainty that they all, or at least the majority, belong to the species *Thrips angusticeps* Uzel: „Il est très intéressant de noter que ce n'est que vers le 15 mai, à l'époque où les lins sont encore très jeunes et tendres, que les oeufs éclosent, par suite de la chaleur de la température printanière" „ayant remarqué une grande quantité de larves toutes jeunes au milieu d'insectes parfaits sur le point de périr, vers la fin du juin ou le commencement de juillet”.

According to LADUREAU his *Thrips lini* produced two generations a year, the larvae of which appear in mid May and towards the end of June or in the beginning of July. This is entirely in agreement with the biology and the phenology of *Thrips angusticeps* Uzel in the southwest of our country. There the flax thrips has only one generation a year, the larvae of which generally appear in flax not before mid June. There is no reason to assume that the mode of life and the phenology of the two species in Northern France would differ considerably from those in the southwest of our country.

From the investigations of FRANSSEN & HUISMAN (1958) it can be concluded that the larvae found in the middle of May by LADUREAU may have belonged exclusively to the species *Thrips angusticeps* Uzel. The larvae which he found in the flax by the end of June and in July presumably have been a mixed population of *Thrips angusticeps* Uzel and the flax thrips, the most important component of this mixed population being undoubtedly *Thrips angusticeps* Uzel.

It is conspicuous that LADUREAU does not include brachypterous thrips, for the shortwinged specimens of *Thrips angusticeps* are found in flax fields in the Netherlands until the beginning of June, although they are rare. The larvae which LADUREAU found in flax in mid May must have been the direct offspring of the short-winged form of *Thrips angusticeps*. Apparently LADUREAU has overlooked the short-winged adults because from mid May onwards they are far less numerous than the long-winged specimens.

To which species did the adult winged specimens described by LADUREAU belong? From the time of appearance of the bad heads various species of Thysanoptera may occur in flax. About mid May especially large numbers of adult flax thrips and of oat thrips (*Stenothrips graminum* Uzel) occur in flax; 10 to 12 days later one can find the macropterous form of *Thrips angusticeps* Uzel. Together with the three above-mentioned species specimens of the genus *Limothrips* may also occur fairly frequently. For several years large numbers of adult thrips were collected in the southwestern part of our country from flax fields from mid May until the harvest. Apart from the brachypterous form of *Thrips angusticeps* the thrips populations appeared to consist of about 74% *Thrips angusticeps* Uzel, 16% flax thrips, 9% *Stenothrips graminum* Uzel and only 1% belonged to other species. *Thrips angusticeps* Uzel therefore greatly

out numbers the other species. Presumably this is also the case in France as is apparent from the biological and phenological data concerning the larvae mentioned by LADUREAU, and from a paper published by BONNEMAISON & BOURNIER (1955). Consequently there is abundant evidence that the majority of the larvae described by LADUREAU belongs to the species *Thrips angusticeps* Uzel and possibly most of the adult specimens observed and described by him.

UZEL (1895), on page 279 of his famous handbook, refers to *Thrips lini* Lad. and makes the following remark: „Die angeführten Kennzeichen beziehen sich auf die Thysanopteren überhaupt“ (The characters mentioned apply on the whole to Thysanoptera). For this reason UZEL does not recognize the name *lini* Lad. and in our opinion rightly, particularly when it is considered that many species of Thysanoptera may occur in flax, only three of which can be very numerous. In the same monograph, however, UZEL describes the females of a species as *Thrips linaria* which he reports to have found in flax flowers in July and August. From his excellent description it is apparent that the species referred to in the Netherlands as "vlastrips" (flax thrips) is identical with *Thrips linaria* Uzel. Confusion with other species of the genus *Thrips* or with *Stenothrips graminum* Uzel is excluded. UZEL found only females in flax and this is in agreement with the observations by DOEKSEN (1938) and with our findings. The males of flax thrips do not migrate to the flax together. They are rarely found in flax and if so then only in flax fields bordering plots on which flax had been grown the previous year.

UZEL (1895) was the first to describe a species of thrips from flax recognizable from the description and the name *linaria* must therefore be considered as the only correct one for the flax thrips. UZEL apparently was of the opinion that the word *Thrips* is feminine; however, the word is masculine. In the „Handbuch für Pflanzenkrankheiten III (1913)“ by SORAUER and REH, page 228, *linaria* Uzel is therefore given as *linarius* Uzel.

We think we have shown that the flax thrips should be known as *Thrips linarius* Uzel and that the name *lini* must be a synonym. In the Netherlands, as has already been mentioned, *Thrips angusticeps* Uzel and *Stenothrips graminum* Uzel can occur frequently in flax, in addition to *Thrips linarius* Uzel. These two species have also been described by UZEL in 1895 as easily recognizable species: UZEL also knew the brachypterous and macropterous forms and the males of *Thrips angusticeps* Uzel.

PRIESNER in 1928 was of the opinion that *linarius* and *angusticeps* can be easily confused and on page 364 of his standard work he even states: „Doch ist dieses Merkmal sowohl wie die Beborstung des Prothorax-Hinterrandes bei *angusticeps* keineswegs konstant, sodass heute durchaus noch nicht sichergestellt ist ob *T. linarius* von *T. angusticeps* wirklich spezifisch verschieden ist. Sicher ist, dass beide Arten gesellig an Flachs (*Linum*) vorkommen“ (Yet this character and also the chaetotaxy of the posterior margin of the prothorax is by no means constant in *angusticeps*, so that so far it has not been established definitely whether *T. linarius* is really distinguishable from *T. angusticeps*. It is certain that both species occur together in flax (*Linum*)). SPEYER (1934) was the first to distinguish the species of the genus *Thrips* by the intermarginal hairs on

the underside of the segments of the abdomen, an important and constant character; on the basis of this character *linarius* and *angusticeps* are also easily distinguishable. For the differences between the two species we refer to the paper of FRANSSEN & HUISMAN (1958) on the biology and control of *Thrips angusticeps* Uzel.

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