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NOTE ON THE NOMENCLATURE OF THE CEREAL ROOT EELWORM [1])

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The species of *Heterodera* parasitic on cereals has recently been attracting increasing attention both in Europe and elsewhere. Amongst the Heteroderas it takes third place after the sugar beet and potato root eelworms as an important pest of agricultural crops. It is widespread in Europe and occurs also in Canada, Australia and Japan. Surveys and research into the biology and control of this nematode have recently been carried out in Britain, Denmark, Germany and Holland.

In current literature the cereal root eelworm is referred to sometimes as *Heterodera major,* sometimes as *H. avenae.* This disagreement as to its correct scientific name is bound to lead to confusion. Since there now exists, in Nematologica, an international journal for the publication of matters concerning nematodes of agricultural importance, it seems appropriate to re-state the history of the nomenclature of this nematode so that agreement may be reached as to its scientific name.

It will be remembered that until 1940 (FRANKLIN, 1940) the cyst-forming plant-parasitic nematodes were generally regarded as one species, *Heterodera schachtii,* although it was recognized that there were "strains" with different host preferences, e.g. "potato strain", "oat strain", "beet strain". Some of these "strains" had been given the status and name of variety, subspecies or even species, but morphological differences between them had not been clearly defined and most workers regarded them all as belonging to the species *H. schachtii.* The cereal root eelworm was one of those which was early recognized as a distinct biological race and, later, morphological differences were observed between it and the sugar beet eelworm. The history of the changes in name and status which this nematode has undergone as a result of these observations is briefly as follows.

In the Danish publication *Tidsskrift for Landbrugets Planteavl* the oat eelworm ("havreaal") was referred to as *Heterodera schachtii* in the annual "Oversigt over Landbrugsplanternes Sygdomme" for the

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year 1894 (ROSTRUP, 1896) and following years. In the same journal HANSEN (1904) published a paper on the oat eelworm in which he clearly recognized it as a distinct biologic race as compared with the beet eelworm, but he did not name it as such. He gave a brief account of the life history, and measurements of cysts, eggs and males, but these appear to have been taken from VAÑHA & STOKLASA's (1896) description of the sugar beet eelworm. In the "Oversigt over Landbrugsplanternes Sygdomme i 1907" by MORTENSEN, ROSTRUP & KØLPIN RAVN (1908), the oat eelworm was for the first time referred to as "*H. schachtii* var. *avenae*". There was no description accompanying this name, merely the record of the occurrence of the nematode. Nor does there appear to be any reference to HANSEN's paper of 1904. In later years the varietal name *avenae* is frequently used in the "Oversigt", but there appears never to have been a description of the nematode nor a reference to a description of it published elsewhere.

The first worker to record definite morphological differences between the sugar beet and the oat eelworms was SCHMIDT (1930). He made measurements of the second stage larvae of the two "strains" and showed that "oat strain" larvae were longer than those of the "beet strain". He therefore named the oat eelworm *H. schachtii* subsp. *major* and the beet eelworm *H. schachtii* subsp. *minor*. This author did not mention the Danish literature on the subject.

Four years later, in his work on nematodes harmful and beneficial to agriculture, FILIPJEV (1934) described the oat root eelworm and raised it to full specific rank, giving it the name *H. avenae*. He mentioned the Danish publications and SCHMIDT's work but considered that since the name *avenae* antedates *major* the former was the correct one to adopt.

No one will dispute that in deciding the correct name of an organism, in cases where more than one name has been used, the principles laid down in the International Rules for Zoological Nomenclature should be followed. In this case the relevant principle is laid down in Article 25 which states the Law of Priority as follows (SCHENK & MCMASTERS, 1948):

"The valid name of a genus or species can be only that name under which it was first designated on the condition:

a) That (prior to January 1, 1931) this name was published and accompanied by an indication, or a definition, or a description; and

b) That the author has applied the principles of binary nomenclature.

Opinion 1. The word "indication", above, is to be construed as follows: A. With regard to *specific* names, an "indication" is (1) a bibliographic reference, or (2) a published figure (illustration), or (3) a definite citation of an earlier name for which a new name is proposed."

At the meeting of the International Commission on Zoological Nomenclature held in Paris in July 1948 (HEMMING, 1950) the Commission agreed to recommend

"that words should be inserted in the *Règles* to make it clear that the citation of the name of the host species of a parasitic species, unaccompanied by any other particulars does not constitute an "indication" of the purpose of Article 25 ..."

Following the principles thus laid down it seems clear that in the case of the cereal root eelworm the name *major,* although given later than *avenae,* is the correct specific name because, so far as the writer has been able to find out, *avenae* was not published together with an adequate "indication". It should, however, be emphasised that the important point is not so much *which* name should be adopted, but that only *one* should be used, and that that one should be chosen in accordance with the International Rules of Zoological Nomenclature. Unless, therefore, some relevant publication or reference has been overlooked, it is clear that the correct name for the cereal root eelworm is *Heterodera major* (O. SCHMIDT, 1930) FRANKLIN, 1940.

ZUSAMMENFASSUNG

In der nematologischen Literatur wird der Hafernematode zuweilen *Heterodera major* und zuweilen *Heterodera avenae* genannt. Um den richtigen Namen zu entscheiden sind die Geschichte der Nomenklatur des Nematoden sowie die Regeln der Internationalen Kommission für Zoologische Nomenklatur zur Feststellung herangezogen worden. Es wird gefolgert, dass der richtige Name *Heterodera major* (O. SCHMIDT, 1930) FRANKLIN, 1940 ist.

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