

Reindeer warble fly larvae found in red deer

Reinens gorm-larver funnet i hjort

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Abstract: Seven third instar larvae of the reindeer warble fly (*Hypoderma* (= *Oedemagena*) *tarandi*) were found in a 2–3 year old male red deer (*Cervus elaphus*) shot on 14 November 1985 at Todalen, western Norway. This is the first report of *H. tarandi* from red deer. In reindeer third instar larvae are found from February to June, and the unusual date of this record indicates a delayed development of the larvae due to abnormal host reactions. Warble fly larvae, probably *H. tarandi*, are also reported from moose (*Alces alces*) in northern Norway.

Key words: *Oedemagena tarandi*, *Hypoderma tarandi*, *Cervus elaphus*, *Rangifer tarandus*, *Alces alces*, reindeer, caribou, red deer, moose, exotic host, unsuitable host, reindeer warble fly, Norway.

Rangifer, 8 (1): 35–37

Introduction

The warble fly *Hypoderma tarandi* is endoparasitic in reindeer and caribou (*Rangifer tarandus*), occurring in most of the holarctic distribution of the host (Zumpt 1965). The adult females attach eggs to leg and body hairs. After hatching the larvae penetrate the skin, migrate intermuscularly and complete their development subcutaneously in the back where they cut respiratory holes through the skin (Bergmann 1917, Grunin 1965, Zumpt 1965). At the end of the third instar the larvae make their way out and are dropped to the ground where they pupate. The generic name used here follows the recent revision by Wood (1987), who included *Oedemagena* as a subgenus of *Hypoderma*.

H. tarandi is regarded as monospecific (Zumpt 1965, Grunin 1965). However, females of *H. tarandi* have been observed settling on dogs, cattle, and even man (Natvig 1939). Eggs are often deposited, and sometimes larvae hatch and penetrate. First instar larvae have been reported from the eye of humans (Syrdalen et al. 1982, Kerney et al. 1987),

and first and second instar larvae also from musk ox (*Ovibos moschatus*) in Canada (Janzen 1970, Alendal and Helle 1983). Nordkvist (in Skjenneberg and Slagsvold 1968) reported *H. tarandi* from roe deer (*Capreolus capreolus*), and this appears to be the only record of *H. tarandi* in a cervid other than reindeer. Here we report *H. tarandi* larvae from red deer.

Material and methods

Seven warble fly larvae were found in the subcutaneous layer of a male red deer shot 14 November 1985 in Todalen, Surnadal, county of Møre og Romsdalen, Western Norway. At least some of the larvae appeared to be dead when detected (G. K. Kvendset, pers. comm.). The animal was estimated to be 2–3 years old. The condition was regarded to be normal.

Three of the larvae were available to us and preserved in 70% ethanol. They were identified from Grunin (1965) and Zumpt (1965), and by comparison with larvae of *H. tarandi* from reindeer.

Results and discussion

The larvae proved to be third instar larvae of *H. tarandi*. The lengths of the three larvae were 18, 18 and 15 mm respectively, but were somewhat shrunken due to the previous treatment. From the degree of sclerotization they were assumed to be fully mature even if they were smaller than mature larvae from reindeer, which may reach a length of up to 30 mm (Zumpt 1965).

Other suspected warble fly species might be the common cattle grub (*Hypoderma bovis*) or the northern cattle grub (*H. lineatum*), once common in Norway (Natvig 1939), but now eradicated in here (Natvig and Mehl 1982) as well as in the rest of northern Europe (Beesley 1974, Minar 1984). According to Zumpt (1965) and Andrews (1978) there are no reports of cattle grubs in red deer. The deer warble fly (*Hypoderma diana*), which in other European countries is found in red deer (i.e. Cameron 1932; Grunin 1965; Zumpt 1965; Sugár 1976; Sleeman 1979, 1983), has never been found in Norway.

The parasite in this report obviously originated from reindeer, the normal host. Semi-domesticated reindeer in the area are known to be infected by *H. tarandi* (N. O. Talgøy, pers. comm.). The overlap in the habitats of reindeer and red deer is most extensive during warm periods in summer when both species migrate to elevated areas. These periods also coincide with the principal times hosts are attacked by *H. tarandi*.

According to Bergmann (1917) *H. tarandi* in reindeer appears in its third instar from March to late June. A few specimens of third instar larvae have, however, been found as early as mid February (Nilssen, unpublished). At the date of the present record, mid November, *H. tarandi* is normally in its first (or possibly in the second) instar. Thus, presence of third instar larvae at this date is abnormal, presumably reflecting the conditions in an *unsuitable* host (terminology, see Holmes 1979). Two explanations are possible: a faster development than normal or, most probable, a slower or arrested development. The latter explanation implies that the infestation took place in the summer of 1984.

It should also be mentioned that 8 big warble fly larvae were found in a moose calf kil-

led ultimo March 1987 near Bæskades, Finnmark, northern Norway (Per Eira, pers. comm.). Unfortunately none of these larvae were preserved. However, as the area has a high population of *H. tarandi* in the semi-domestic reindeer herds (Nilssen, unpublished), it is probably that these larvae also were *H. tarandi*.

There are few observations in the literature of warble fly larvae in other animals than the host species. Breyev and Minar (1976) adduce that the high specificity of warble flies indicate a high adaptability of the host parasite relationships. The general theory is that other animals is less susceptible due to innate resistance. If a warble fly occasionally is able to invade an accidental host, it may cause severe pathological reactions. This was the situation when the deer warble fly infested introduced reindeer in Scotland (Kettle and Utsi 1955). Abnormal behaviour of the larvae was also observed. In the present case abnormal reactions were seen as delayed development of the parasite.

Accidental infestations by warble flies on «wrong host» species may be more common than previously considered, and as «host» and parasite are not mutually adapted, severe pathological reactions on the host may occur.

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Manuscript received 22. August, 1988.