

Blowfly myiasis (Diptera: Calliphoridae, Sarcophagidae) in the hedgehog (*Erinaceus europaeus* L.)

S. ACHIM NIELSEN, B. OVERGAARD NIELSEN & H. WALHOVD

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From mid-August to early September 1977 twenty one cases of blowfly myiasis in Danish hedgehogs were recorded. The hedgehogs in question were 18 piglets, probably 8-14 days old and presumably motherless, two somewhat heavier juveniles, and one adult specimen trapped in a wire fence. Maggots were observed in eyes, ears, mouth, nostrils, and anus; wound myiasis was only observed once. *Calliphora vicina* R.-D., *Lucilia illustris* Mg., *L. ampullacea* Vill., *L. caesar* L., and *Sarcophaga melanura* Mg. hatched from the hedgehogs; at least *C. vicina* and *L. ampullacea* acted as primary producers of blowfly myiasis. Lethargy is suggested to be a contributory cause of the high frequency of blowfly myiasis.

S. Achim Nielsen, Zoologisk Laboratorium, Ole Worms allé, Bygning 140, Århus Universitet, DK-8000 Århus C., Danmark.

B. Overgaard Nielsen, same address.

H. Walhovd, same address.

Several fly-species are concerned in myiasis in live vertebrate animals, the maggots feeding on the host's dead or living tissue, liquid body-substances, or ingested food (cf. Zumpt, 1965). In Denmark greenbottles (*Lucilia* R.-D., Calliphoridae) have been recorded as causing myiasis in vertebrates, e. g. in toads (Meinert, 1889; Kryger, 1920; Knud-Erik Hede, 1976, pers. comm.), sheep (Cragg, 1950), and man (e. g. Meinert, 1887-88; Haarløv & Trabjerg, 1958); however, apparently Danish records are sparse.

In connection with current studies on the ecology of the hedgehog (*Erinaceus europaeus* L.) (Walhovd, 1977), several reports on blowfly myiasis in Danish hedgehogs were received from the public. Twenty one of these cases were recorded between mid-August and early September 1977 from the following localities: Jutland: Silkeborg, Bjerringbro, Malling; Zealand: København N., Lyngby, Herlev, Glostrup, Hellerup (2 localities), Solrød Strand, Hillerød, Vipperød, Ringsted; Lolland: Vesterborg. The hedgehogs in question were 18 piglets (body weight 40-110 grams), still unweaned, and probably 8-14 days old (Morris, 1967); presumably the piglets were motherless. Further, two somewhat heavier juveniles and an adult specimen trapped in a wire fence were in-

fectured. Sixteen of the juvenile hedgehogs, three while still alive, were forwarded to the laboratory. In five cases our information is solely due to personal communication with the observers. According to the descriptions given, all hedgehogs included in our material were infected while alive. Two of the hedgehogs examined were dissected in order to locate the distribution of maggots in vital organs. In all animals the type and the degree, the site and the progress of the infection were recorded. Finally, the sixteen carcasses were transferred to flycages.

Blowfly eggs were reported to be present in mouth, eyes, ears, near anus, or in between the spines. Apparently, eyes and ears (Fig. 1) were favoured points of infection. According to the reports received, blowfly infection may be very heavy in live hedgehog piglets. This was indicated by statements like: "covered by blowfly eggs", "maggots all over the piglet", the latter obviously representing blowfly myiasis at an advanced stage. In the hedgehogs examined, maggots were primarily observed in the natural apertures of the body, viz. eyes, ears, mouth, nostrils, or anus. Wound myiasis was only observed once, viz. maggots living in an incised wound near the left foreleg of a young hedgehog.

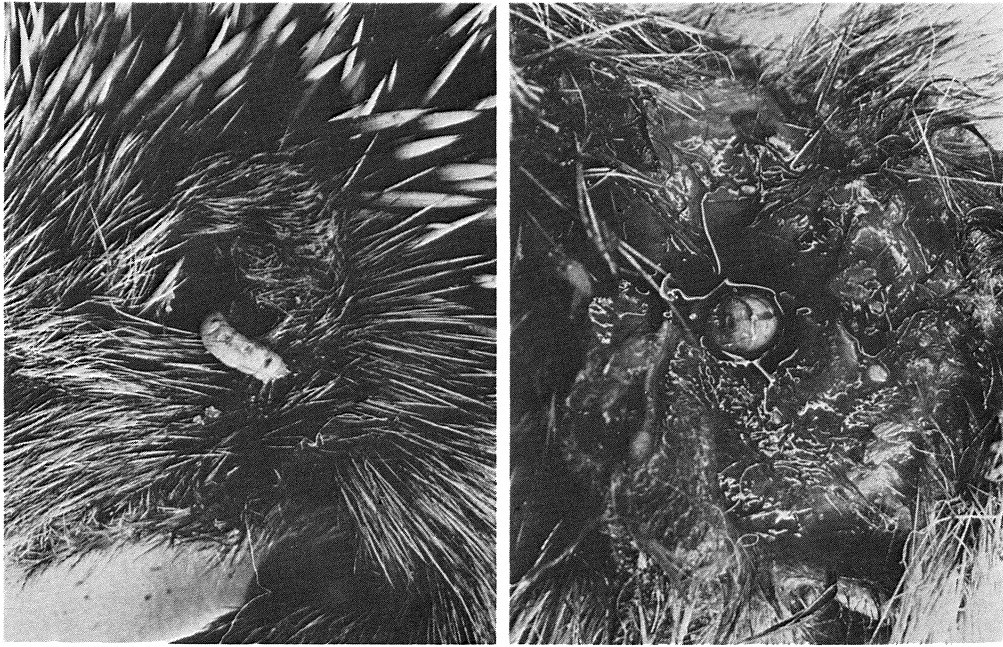


Fig. 1. Ear of hedgehog piglet infected by blowfly maggots (*Lucilia ampullacea* Vill.). Left: maggot in the external auditory meatus; right: maggot (in the centre of the photo) revealed by dissection of middle ear (N. Skyberg phot.).

A total of 176 blowflies hatched from the hedgehogs, viz. *Calliphora vicina* R.-D. 4 ♂♂, 41 ♀♀ *Lucilia illustris* Mg. 28 ♂♂, 58 ♀♀, *L. ampullacea* Vill. 12 ♂♂, 15 ♀♀, *L. caesar* L. 6 ♂♂, 11 ♀♀, and *Sarcophaga melanura* Mg. 1 ♀; *C. vicina* was concerned in 6 cases of myiasis, *L. ampullacea* in 5, *L. illustris* in 3, and *L. caesar* in 2 cases. The following species associations were observed: 1. *C. vicina* - *L. illustris* - *L. ampullacea* - *L. caesar*, 2. *C. vicina* - *L. illustris* - *S. melanura*, 3. *L. illustris* - *L. ampullacea* - *L. caesar*, and 4. *C. vicina* - *L. ampullacea*. In two and three cases, respectively, *L. ampullacea* and *C. vicina* acted alone; the former species was recorded from the ears, the latter from nostrils, mouth, and anus of hedgehogs. This means that at least *L. ampullacea* and *C. vicina* acted as primary producers of blowfly myiasis in hedgehogs; in all other cases it is impossible to decide which species were primary producers, since secondary blowfly invasion before or after the death of the host may have occurred.

In two live piglets the ears were infected by *L. ampullacea*. Dissection revealed 3-4 maggots penetrating from each auditory meatus to the middle ear.

Apparently, previous records of blowfly myiasis in Danish hedgehogs are scarce. A case of wound myiasis was observed in an adult hedgehog caught in 1894 in the garden of The Royal Veterinary and Agricultural University, Copenhagen (specimen in the collection of the Zoolo-

gical Institute, N. Haarløv, pers. comm.). Widespread blowfly myiasis was recorded in a hedgehog at Randkløve, Bornholm; it was impossible to decide whether this was a case of wound myiasis or not (P. Johnsen, pers. comm.). Finally, Nielsen (1967) reported a case of wound myiasis in a young hedgehog.

Myiasis in other species of wild mammals in this country has so far not been reported, whereas the present study indicates that the infection frequency in hedgehogs under certain circumstances may be high. It should be remembered, however, that the observation intensity was particularly high during August-September 1977, when some 425 reports on hedgehog litters and piglets were received in our laboratory. In ten-folds of the records made, the observers maintained the discovered piglets (typically found outside the breeding nest and presumably motherless) to be cold, weak, and sometimes seemingly inanimate. The majority of these piglets, when not infected by blowflies, recovered, because they on recommendation were given artificial heating and later on food and careful rearing. The body temperature (unfortunately not measured) of the three live infected piglets

was estimated to be far below the body temperature of an awake hedgehog. These observations all indicate that hedgehog piglets under certain circumstances may aestivate. Other reports seem to suggest that even adult hedgehogs sometimes become lethargic in summer. This is reasonable as an assumption because an awake mammalian hibernator in summer may differ from true homiotherms in having for instance an insufficient thermoregulation (Kayser, 1965). On the other hand, during large-scale breeding of hedgehogs, aestivating animals have not been observed (B. Morris, in litt.).

Unquestionably, a lethargic hedgehog represents an adequate and attractive oviposition site for blowflies and thus the risk for blowfly attack is greatly increased in such specimens. Considered in the light of blowfly myiasis, aestivation seems very inexpedient.

In further studies body temperature of infected hedgehogs should be measured in order to elucidate the potential role of lethargy in this context. Further, observers should isolate infected animals in flycages straight upon the destruction of the infected animal in order to eliminate the possibility for secondary blowfly invasion.

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Sammendrag:

Myiasis fremkaldt af spyfluer (Diptera: Calliphoridae & Sarcophagidae) hos pindsvin (*Erinaceus europaeus* L.).

Adskillige fluearter, især spyfluer, kan fremkalde myiasis hos levende hvirveldyr, dvs. at maddikerne lever af værtens levende væv, kropsvæsker, etc. Fra midten af august til først i september 1977 rapporteredes 21 sikre tilfælde af myiasis hos levende pindsvin fra lokaliteter i Jylland, på Sjælland og Lolland. 16 angrebne pindsvin – heraf 3 levende – blev undersøgt på Zoologisk Laboratorium; maddikeangrebene var især koncentreret omkring kroppens naturlige åbninger – øjne, ører, næse og mund, samt anus. Kun i ét tilfælde var der tale om sår-myiasis. Fra pindsvinene klækkedes 176 spyfluer, nemlig *Calliphora vicina* R.-D., *Lucilia illustris* Mg., *L. ampullacea* Vill., *L. caesar* L. og *Sarcophaga melanura* Mg. *C. vicina* var involveret i 6 af de registrerede tilfælde, *L. ampullacea* i 5, *L. illustris* i 3 og *L. caesar* i 2. *C. vicina* og *L. ampullacea* blev med sikkerhed påvist som primære myiasis-fremkaldende arter; sekundær infektion før eller efter værtens død må påregnes.

I to tilfælde registreredes angreb af *L. ampullacea* i øregang og mellemøre på levende pindsvineunger; disektion afslørede 3–4 maddiker i hvert øre.

Til trods for at befolkningens opmærksomhed i de senere år er blevet rettet mod pindsvinet, tyder meget på, at de mange observationer af myiasis hos pindsvin afspejler en reel høj myiasisfrekvens hos dette pattedyr. 18 af de angrebne pindsvin var små unger (vægt 40–110 g), antagelig 8–14 dage gamle og sandsynligvis moderløse. Endvidere var 2 lidt ældre unger samt et voksent pindsvin, der hang fast i et trådhegn, angrebet. Meget tyder på, at samtlige angrebne pindsvin havde været i en stræss-situation. For ungerne vedkommede oplystes, at de blev fundet udenfor ynglereden, føltes kolde og syntes i første omgang livløse. Disse oplysninger antyder, at pindsvineunger under visse omstændigheder kan æstivere og muligvis kan endog vokse pindsvin om sommeren undertiden gå over i en lethargisk tilstand. Det er givet, at pindsvin i en situation, hvor legemstemperaturen er nedsat og bevægeligheden betydeligt reduceret, kan tiltrække spyfluer, der villigt lægger æg på de tilsyneladende livløse dyr. Eventuel æstivation hos pindsvin synes uhensigtsmæssig, idet den åbner mulighed for spyflueinfektion. I de her omtalte tilfælde drejede det sig dog om individer uden reelle overlevelschancer, hvor spyflueangrebet blot har fremskyndet en ellers langsom død. I en fortsat undersøgelse vil legemstemperaturen hos angrebne pindsvin blive målt og sekundære spyflueinfektioner søgt begrænset mest muligt.