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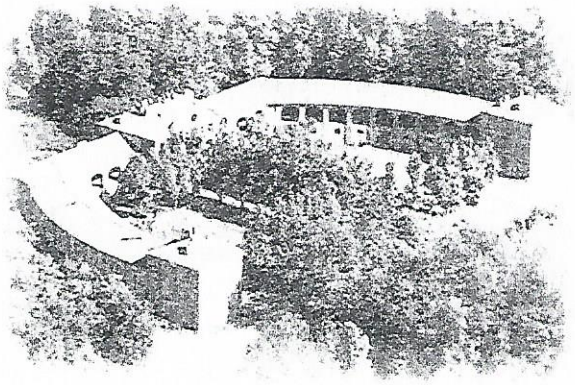

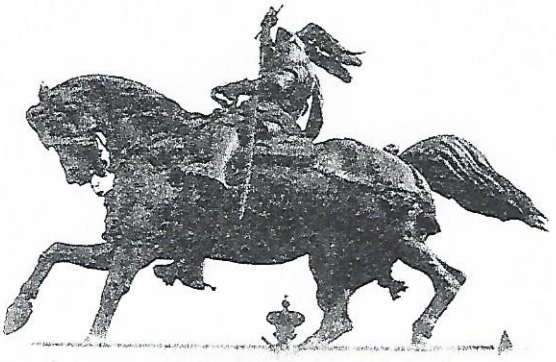

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Dermatopathy by aculeate micro-hymenoptera in stabled and grazing horses

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Riassunto: *Vengono descritti n. 3 episodi di puntura di equini dovuti a tre differenti microimenotteri: Solenopsis fugax, una formica che attacca gli animali sia in stalla che all'aperto; Sclerodermia domesticum e Cephalonomia gallicola che pungono gli animali generalmente all'interno dei ricoveri, in quanto il loro ciclo si svolge in associazione ai tarli del legno. La risoluzione della dermopatia è correlata all'identificazione dell'insetto responsabile, che viene svelato attraverso l'utilizzo di una tecnica diagnostica chiamata E.D.P.A. (Esame Diretto delle Polveri Ambientali).*

Summary: Three cases of horses stung by three different species of micro-hymenoptera are described: *Solenopsis fugax*, an ant that attacks animals both in the stable and in open air; *Scleroderma domesticum* and *Cephalonomia gallicola*, which usually sting animals inside the horse shed, as their cycle develops in association with the woodwarms. The resolution of the dermatitis is related to the identification of the responsible insect which is pointed out by a diagnostic technique called E.D.P.A. (Direct Examination of Environmental Dust).

Introduction

Hymenoptera, one of the largest orders of insects, have considerable medical interest, as they may be responsible for allergic reactions in humans and animals.
Among the best-studied examples, families such as *Apidae* and *Vespidae* are large aculeate insects that include bees, wasps, hornets, bumblebees and others. In addition to those, several micro-hymenoptera are also of considerable interest, and, in recent years, many of them have been gaining importance due to representing a domestic threat. Among these are micro-hymenoptera belonging to the families of *Formicidae* and *Bethylidae* (Guiglia, 1956; Stella, 1985).
Through the Direct Examination of Environmental Dust (E.D.P.A.), a diagnostic elective technique that identifies these arthropods in confined environments (Principato, 1998), we found several species of medical interest in Umbria: *Scleroderma domesticum*, *Cephalonomia gallicola*, *Allepyris ruficrus* (Fam. *Bethylidae*), and *Solenopsis fugax* and *Tetramorium caespitum* (Fam. *Formicidae*).
Of these, three have a particular veterinary interest, because they can affect domestic animals: *Scleroderma domesticum*, *Cephalonomia gallicola* and *Solenopsis fugax*. These micro-hymenoptera are characterized by the presence of a long sharp sting, which cause lesions that are often hardly visible but are extremely itchy and painful.
The *Bethylidae*, genera *Scleroderma* and *Cephalonomia*, are all parasites of larvae of coleopters, injecting a poison that paralyzes, making them a trophic substrate for their offspring. While their cycle is done in domestic environments at the expense of the larvae of the woodworm (generally *Oligomerus ptilinoides* or *Anobium punctatum*), in nature they are parasitic of all woodworms that colonize fences, window frames, reed roofs and any type of timber, including old rotting trunks. Moreover the genus *Cephalonomia* may also develop at the expense of the larvae of coleopters that infest food, as *Stegobium paniceum* or *Oryzaephilus surinamensis*.
In the case of the genus *Solenopsis* (*Formicidae* family), from which were identified over 200 species worldwide, the bites occur when they are trapped in a confined environment or when their nest is threatened. These ants, in fact, are continually expanding and are colonizing Central Italy more and more widely, by developing shallow nests containing each over 10 000 individuals.
Since these infestations have been more frequent in Italy and have caused dermatological disorders, we think that may be useful for veterinarians to be aware of the interaction between domestic animals and these insects. We report, therefore, in this note, some significant episodes of puncture due to aculeate micro-hymenoptera, in some stabled and grazing horses.

Material and Methods

Parasitological surveys were carried out in 2 horse stables and in 2 fenced paddocks (one of these was covered with reeds), where there had reportedly occurred bites both in personnel and in animals. Horses were stung in particular hours of the day and showed the presence of a papule-vesicular dermatitis obvious to the touch. In order to make a diagnosis the Direct Examination of Environmental Dust (EDPA) was used. It is a diagnostical technique based on a thorough method of filtration, flotation and sedimentation of indoor dust, in which pathogenic arthropods are found and isolated as whole specimens or whose presence is revealed by their traces, such as parts of their bodies, exuviae, faeces and so on.

The Direct Examination of Environmental Dust (E.D.P.A.) was conducted in stables through analysis of soil, of straw and of feeds. In open areas this examination was conducted on samples of surface soil collected when the horses were grazing, next to the fence and under the reed roof.

Results and Discussion

E.D.P.A. revealed the presence of 3 different micro-hymenoptera, each linked to a different habitats: a) *Cephalonomia gallicola* (*Bethylidae*) in the worm-holed reeds of roof (Fig. 1); b) *Scleroderma domesticum* (*Bethylidae*) in the old worm-holed wood of the fence (Fig. 2); c) *Solenopsis fugax* (*Formicidae*) in the surface soil near to the fence and inside the stable (Fig.3).

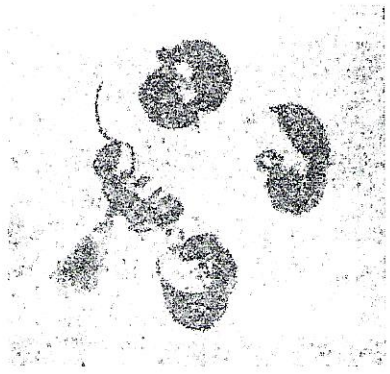


Figure 1. *Cephalonomia gallicola.*

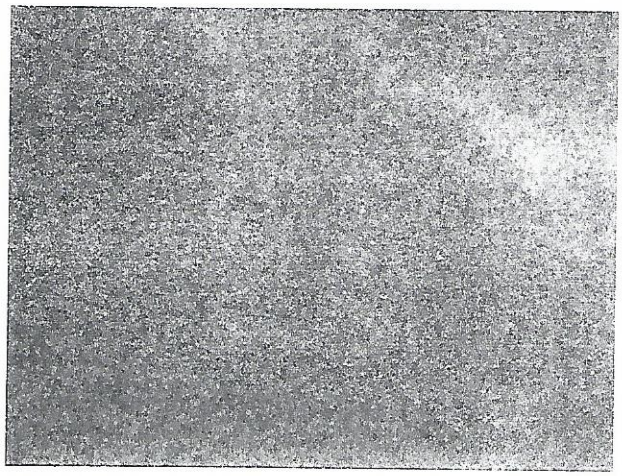
Figure 2. *Sclerodermia domesticum.*

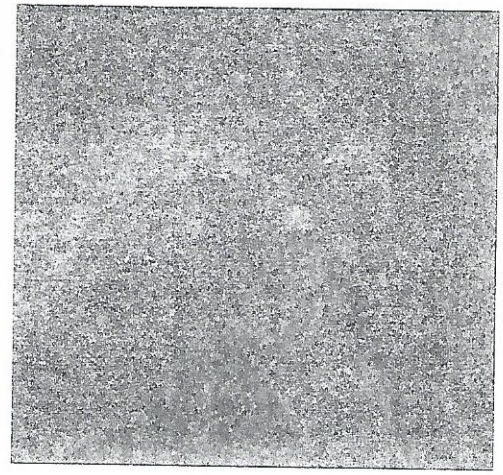
Figure 3. *Solenopsis fugax.*

Outbreaks of dermatitis have been reported duringsummertime, particularly in June, July and August.

The first episode, occurring in June, was due to the presence of *Cephalonomia gallicola* in the worm-holed reeds of roof. The animals that were housed there, as well as staff, were stung at the abdomen and hips, and were unable to identify the cause. Infestation controlling measures included stables disinfestations and staff clothing washing at 90°C. However the infestation was not solved by these measures. After E.D.P.A. analysis, that revealed the cause of skin lesions, it was sufficient to remove the reed roof to solve immediately the problem. Lesions had already been resolved in about one month and there were no further lesions.

The second episode, occurred in July, regarded one horse that was grazing in a paddock with a fence building with a old worm-holed wood. A yellowish powder that was found inside the wood revealed the presence of live and active woodworms. At the E.D.P.A., we detected *Scleroderma domesticum* (*Bethylidae*) and one of these insects was also found on the horse coat. The animal showed itch, particularly in abdomen and in the groin area, but had no evident lesions. On palpation, 3 closely aligned nodules were to be observed, pea-line in size. The problem was solved by replacing the fence's worm-holed wood, but the skin lesions recovery was very slow, with the disappearance of subcutaneous nodules only after 2 months.





Figures 4 and 5. Wheals in the abdomen and hips by *Solenopsis fugax*.

The third episode occurred in August on 3 horses that were grazing in a fenced area. Animals showed nervousness, with frequent and sudden tail movements. There were wheals in the abdomen and hips (Figs. 4, 5). The Direct Examination of Environmental Dust (E.D.P.A.) revealed the presence on the soil of nests of *Solenopsis fugax* and specimens of this species were recovered in the straw. This episodes of dermatitis occurred concurrently with soil removal for gardening works. The resolution of the case was reached only through paddocks disinfestations and soil replacement, that was performed twice.

Conclusions

We want first of all to highlight the application of this method, not only in confined areas but also in the outdoor environments, opens new diagnostic possibilities and application fields. The diagnostic difficulties on these micro-hymenoptera is due to their poor visibility, contrary to what happens with other genera of hymenoptera (*Vespa*, *Polistes*, *Xilocopa*, *Bombus* and others). Moreover, both *Scleroderma* and *Cephalonomia* live in wood-worms tunnels and are well hidden (Principato and Polidori, 1995). *Solenopsis*, however, despite being a free-living insect, is so small (1.4 mm in length) to escape even a careful observation. E.D.P.A. has, in these cases, an important diagnostic role.

In our opinion, on suspecting skin disease from micro-hymenoptera, any coincidence of the animals' nervousness and lesions development in humans should be examined, or the coincidence between the onset of skin lesions and concurrent restoration works involving stables or the surrounding areas. Both *Bethylidae* and *Formicidae* of genus *Solenopsis*, in fact, become parasites of human or of domestic animal only in particular circumstances. For example, in confined spaces, they bite humans when they feel trapped in domestic environments or within clothes (Trentini *et al.*, 1992; Principato, 2000; Principato *et al.*, 2000; Principato *et al.*, 2005; Principato *et al.*, 2008). The same thing happens with animals, which are not aware of contact with these insects and are affected by their venom when it is being inoculated. Although there are other aculeate micro-hymenoptera of sanitary importance such as *Bethylidae* of genus *Allepyris* (Principato and Lapomarda, 2005) or *Formicidae* of genus *Tetramorium*, their interest in veterinary medicine is low, because their sting is extremely small and probably not capable of fixing them on the animal skin. In contrast, *Scleroderma*, *Cephalonomia* and *Solenopsis* have a very long and sturdy retractable sting, that can penetrate easily and deeply into the skin (Fig. 6).

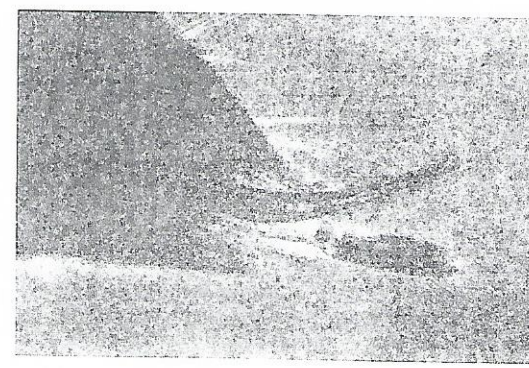


Figure 6. Sting of *Scleroderma domesticum*

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