



## Mites associated with early decomposition stages of pigs (*Sus scrofa domestica*) in Texcoco, Mexico\*

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Mites can be found in various habitats, they are sensitive to climate variation and disturbance of ecosystems. Many mites are phoretic on insects that are associated with plant and animal decomposition, therefore they can provide relevant information to forensic investigations, such as post-mortem time, causes of death, or temporal and geographical conditions of the place where the body was found. The study of mites at a crime scene or as part of the evidence that can be collected has very important functions. For example, mites can be used to determine cases of food contamination, to track shipments of illegal substances, as well as in investigations of murders, missing persons or cases of negligence. Mites are always present, even in environments where the presence of insects is scarce. Despite this importance, studies on the diversity of mites associated with decomposing bodies are scarce, and work on the matter is just beginning in Mexico.

Here, a study on cadaveric decomposition of pig heads was established in San Nicolás Huexotla, Texcoco, Mexico. The decomposition of three pig heads was evaluated in three treatments: exposed, buried, exposed for a week and later buried (semi-exposed). Four sampling times were: (1) one month before the placement of the heads, (2) day one, (3) day seven and (4) day fifteen. Three 1L soil samples per treatment plus a control were collected and processed in Berlese-Tullgren funnels for two weeks. A total of 1141 oribatid mites were registered from 11 families (Cybaeremaeidae, Galumnidae, Scheloribatidae, Microzetidae, Oppiidae, Ceratozetidae, Lohmanniidae, Hermanniidae, Oribatellidae and two unknown families), 15 genera and 18 species. Oppidae and Scheloribatidae were the families with the greatest diversity of species; *Allogalumna* sp. 1, *Schelorbates* sp. 1, Oppidae sp. 3 and *Ceratozetes* sp. 1 were the most abundant and frequent species. At sampling times 1 and 2, the highest abundance and diversity was recorded in the exposed head, while at sampling time 3 and 4 the highest abundance and diversity was in the semi-exposed head. As the decomposition process progressed, the semi-exposed and buried head had a greater number of Oribatida compared to the control; diversity remained constant at the four sampling times. A total of 427 gamasid mites were collected from 11 families (Laelapidae, Phytoseiidae, Macrochelidae, Parasitidae, Ologamasidae, Uropodidae, Pachylaelapidae, Ameroseiidae, Trematuridae, Digamasellidae, Ascidae) and 14 genera. The most diverse families were Macrochelidae, Ameroseiidae and Laelapidae. The distribution of the families was different in the treatments. Phytoseiidae, Laelapidae and Macrochelidae occurred in all three treatments, while Ologamasidae and Ameroseiidae were only found in the exposed and semi-exposed heads; in the buried head only Macrochelidae, Phytoseiidae and Laelapidae were found. The semi-exposed head was the most diverse; in the control, only Laelapidae were found, with low diversity. A total of 22 families and 29 genera belonging to oribatid and gamasid mites were associated with cadaveric decomposition. The presence of the Phytoseiidae in soil samples represents a new record. The diversity found reinforces the importance of these groups for work in forensic sciences. A generalized observation among the species was the increase in the reproductive capacity of the studied species.

**Keywords:** Acarology, forensic, Oribatida, Gamasida, soil, Mexico