

Pesets'ola: WHICH BED BUG DID THE HOPI KNOW?

(A present for Robert Leslie Usinger's 100th birthday)

Klaus Reinhardt

In 2012, bed bugs are reaching their highest abundance in North America since the 1940's. This year also marks the 100th anniversary of the birth of the man who most prominently contributed to the knowledge of their biology. Robert Leslie Usinger (1912–1968) was arguably one of the greatest insect taxonomists. His fascinating life story can be found in his autobiography (Usinger 1972) and other sources (Linsley and Ashlock 1969).

Usinger is probably best known as the author of one of the most outstanding insect monographs (Usinger 1966). *A Monograph of the Cimicidae* remains the standard reference book for any aspect of bed bug biology and taxonomy to the present day, still receiving one citation every month since the year 2000. On the second page of his opus, Usinger used the absence of native names for bed bugs in any of the Native American languages as one piece of evidence that the common bed bug *Cimex lectularius* was introduced to the Americas from the Old World (Usinger 1966). This must have been one of the first uses of linguistics to answer a biogeographical question. Because Usinger's thoroughness and accuracy has been consistently proven when describing other aspects of bed bug biology, his findings of a lack of Native American names for bed bugs have been repeated ever since. But was he right?

In 1997, Ekkehart Malotki from Arizona State University edited *The Bedbugs' Night Dance and other Hopi Tales of Sexual Encounter* (Fig. 1). The age of the recorded stories is not known, but as with many stories communicated through oral tradition, they are thought to predate European arrival. The book contains Hopi tales printed in both Hopi and English, and in two stories, bed bugs (*pesets'ola*) are the major actors. In "Bedbug Woman and Louse Woman" and "The Bedbugs' Night Dance," *pesets'ola* suck blood and don't fly. They retreat to refugia after feeding and so do not fit the characteristics of flies, mosquitoes, lice, or fleas. They seem to be too small to represent assassin bugs. Therefore, *pesets'ola* seem to be bed bugs. Was Usinger wrong?

When I discovered this book in 2007, I wrote to Ekkehart Malotki trying to find out whether *pesets'ola* had any literal meaning, was related to any other Native language, or might show some twisted origin of Spanish or English that could point to European influences. Ekkehart told me of a colleague at Arizona State University who was an expert in the Hopi language, whom he would contact on my behalf. Unfortunately, my wait for Ekkehart's e-mail response was not rewarded; the Hopi expert had died just a few days earlier. It took me ten years to discover the book, and just a few days before a solution might have been presented, all hope of an answer had vanished.

Somehow it seemed unlikely that Usinger was not right, and I wondered -whether *pesets'ola* might be a different species than the bed bug that traveled to America with the European settlers. I read the stories again and marked seven characters of the *pesets'ola* that the Hopi described in their tales, which might give us some clue as to their identity:

- 1) Obviously, *pesets'ola* must have lived in current-day Arizona, where the Hopi live(d).

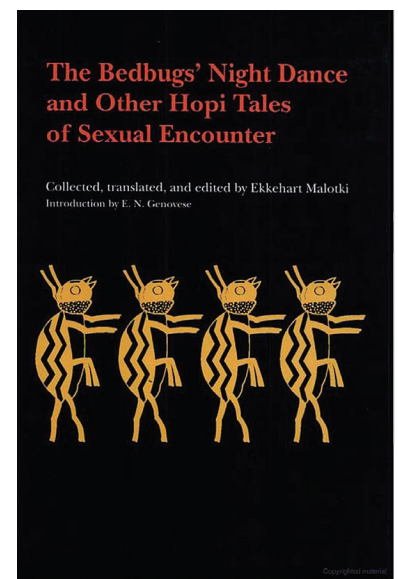


Fig. 1. A book on Hopi stories with two stories referring extensively to bed bugs using a native name, *pesets'ola*.

- 2) The *pesets'ola* were very abundant and sought hosts when temperatures were warm.
- 3) They lived in holes and cracks.
- 4) Their habitat was often found among high cliffs.
- 5) They left their shelter for a blood meal after dark and came back before daylight.
- 6) They fled rapidly when people lit the fire in their house.
- 7) The strong association of bed bugs with sexual activity suggested to me that the Hopi might have observed the *pesets'ola* to mate quite frequently (although other, very distant cultures also make an explicit connection between sexual activity and bed bugs).

It is good practice in "cimexology" to first consult Usinger's opus (1966) on any aspect of the life of bed bugs. The species Usinger reports from the southwestern United States are *Cimex incrassatus* and *C. pilosellus*, *Oeciacus vicarius*, *Haematosiphon inodorus*, and two *Hesperocimex* species. Some of them have been recorded to occasionally bite humans, but *Haematosiphon inodorus*, the Mexican chicken bug, has been reported to have a natural, though rare, association with humans: this species shows "no reluctance to feed on human subjects" (Lee 1955). Usinger's classic dorsal and ventral illustrations of the chicken bug (Fig. 2) looked similar enough to the common bed bug to follow this trail.

Usinger had a student researching the biology of the Mexican chicken bug. Robert D. Lee found that human dwellings close to chicken farms could be heavily infested with these insects (Lee 1955). They live in Arizona and can be abundant—meeting two of the seven features of the Hopis' biological observations. Unfortunately, none of these points distinguish *H. inodorus* from *Cimex lectularius*, which is also found in houses and chicken farms in the southwestern U.S.

Usinger, Lee, and other authors (Di Iori and Turienzo 2009) identified other hosts of *H. inodorus*: owls, birds of prey, and even the California condor. Lee collected chicken bugs from holes and cracks near the nests of owls and found them up to 2 m away from the nest. Lee also described where he found the owls' nests: 8 to 9 m up the side of a 12 m cliff (meeting points three and four of the Hopi criteria). In bird nests, *H. inodorus* can be very abundant, too—up to 30,000 bugs per nest (Grubb et al. 1986).

Pesets'ola are explicitly described to be nocturnal feeders, but one story told of a female who had been looking during the day for her unfaithful husband. Lee (1955) described that *H. inodorus* fed better in partial darkness, but he also showed that when they were not feeding, they did not necessarily seek darkness (Lee 1954); so, with a bit of leeway, there is some congruence for point five. Lee (1955) then remarked that *H. inodorus* move about with "swiftness." That matches point six and is an interesting clue, because while *Cimex*

lectularius is not sluggish, "swift" is certainly not a word that comes to mind when one sees bed bugs running away. Finally, Lee also mentioned that copulations can easily be observed in *H. inodorus*. Point seven, met!

Such was Usinger's depth that it took 45 years and this little excursion into literature and ethnoentomology to provide an addition to Usinger's collection of Native American species names for bed bugs. It did not show whether the common bed bug colonized America before the European settlers, but I now dare to propose a hypothesis as to why the Hopi have a native word for bed bugs: the cliffs around the mesas on top of which the Hopi traditionally lived provided good habitats for owls, condors, and their associated bugs. The bugs made excursions into Hopi dwellings, perhaps especially at times when the raptor and owl chicks—the bugs' food sources—were not yet hatched and temperatures began to rise in the spring, but when it was still cold enough to require a fire in people's houses. During these excursions, the bugs and their behavior were observed by the Hopi and immortalized in their tales.

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Klaus Reinhardt is Advanced Fellow of the VolkswagenStiftung in Tübingen (Germany). He has been using bed bugs as model systems in his research and researches the cultural history of the bed bug.

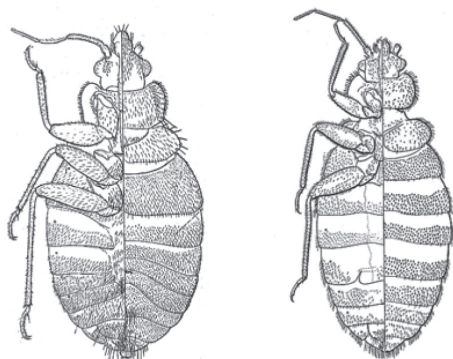


Fig. 2. Similarity between the Mexican chicken bug, *Haematosiphon inodorus* (left) and the common bed bug *Cimex lectularius* (right), from Usinger (1966).

What is it? answer. Ascospores of a pathogenic fungus, *Ophiostoma pini*, in a pit on an elytron of the pine engraver, *Ips pini* (Say) (Coleoptera: Curculionidae: Scolytinae). A tactile seta protrudes from the pit. The viscous spores adhere to newly transformed adults; those embedded in pits are retained and serve to inoculate and overcome live host trees.

This photo was submitted by Malcolm Furniss, 1825 Orchard Ave., Moscow, ID 83843, MalFurniss@turbonet.com.

If you have a color photograph of an insect, insect part, or entomological apparatus that you would like to submit for the "What is it?" feature, please e-mail a 300-dpi TIF and a description of the image to the editor at cdarwin@aol.com.