Reply to “Premature Proposal of the Pine Weevil as a Vector of a Human Pathogen”

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We thank our Swedish colleagues (1) for reading our paper (2). We feel honored that our description of the first clinical case of sepsis caused by *Capnocytophaga canimorsus*, which was most probably vector transmitted, has attracted attention. We feel delighted by the fact that our work represented multi-disciplinary research and that we were able to give input to Swedish scientists to extend their studies on oral microbiota of insects that are potential vectors of devastating infectious diseases.

The Swedish entomologists claim that they have handled the insects with their bare fingers, and that they have never been bitten. In their opinion, the insects only occasionally nibble the skin using their mandibles and cause no visible injury. We agree that pine weevils usually behave in that way when they attach to skin with the hooks on their legs. They are not usually aggressive if one handles them with one's bare fingers.

However, pine weevils can cause damage by gnawing on the bark of trees (Fig. 1). Bark is much harder than the keratinized skin of fingers. So, their mandibles do have sufficient force to break skin. Adult feeding of pine weevils is a serious problem for planted forest seedlings because a weevil can eat about 0.2 cm² of bark per day (3). Moreover, weevils can gnaw polyvinylchloride (PVC) plastic in laboratory experiments if they are placed in petri dishes with bored ventilation holes (unpublished data from Heli Viiri).

Humans have softer and thinner skin on their necks or throats (e.g., fossa cubitalis or fossa axillaris or on perineum) than on their fingers. We do believe that these insects are able to perforate the skin of any body part.

It was not extraordinary that the bite mark observed at admission was a red patch of a diameter of 3 to 4 cm with a darker red raised center. We should have presented the case in more detail. The exact place of the bite was the lateral-anterior part of the patient's neck. This area is sensitive to touch, and when bitten by an insect, humans tend to slap the insect, which had actually happened in this case. The pine weevil was slapped and identified. Minor traumas of the skin or insect bites in the summertime usually do not require medical intervention. The bite mark reported in our case was described when advanced secondary cellulitis had spread over the patient's neck. Severe pain around the shoulder was the reason for the patient's hospital admission.

We do not know if *C. canimorsus* can be transmitted by pine weevils, e.g., by a dog's oral cavity, but we found a picture of a dog with a weevil on its nose (information available on request).

We do not believe that the Swedish population of weevils behave differently than do their Finnish counterparts. We do not know either if large pine weevils carry *Capnocytophaga* in

FIG 1 Large pine weevil eating Norway spruce (*Picea abies* L.) bark. (Copyright, Metla/Erkki Oksanen; reproduced with permission.)

Editor: K. C. Carroll

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This is a response to a letter by Terenius et al. (doi:10.1128/JCM.02167-14).

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doi:10.1128/JCM.02229-14

their oral cavities. We agree that we have never performed PCR-based studies to find whether this is, in theory, possible. We hope that, with the advent of whole-genome sequencing, researchers might do additional studies on this topic. It is not known either what the minimal infectious dose for *Capnocytophaga* is.

All in all, we were the first to raise the suspicion that large pine weevils can occasionally bite humans and transmit bacteria causing sepsis. This is, in fact, very intriguing. We agree that more research is needed. We hope that Swedish colleagues can contribute to this research.

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