Occurrence and migration on snow, and phenology of egg-laying in the winter-active insect *Boreus* sp. (Mecoptera)

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In SE Norway, *Boreus westwoodi* and *B. hyemalis* can be found on the snow surface in coniferous forests throughout the winter, mainly in calm, cloudy weather around or slightly above 0°C. While often at rest or moving slowly around, the insects may show active migration behaviour, especially on warmer, more or less sunny days. During migration, each insect moves in a fixed direction by continuous jumping, covering up to 1.2 m per minute. Different individuals, however, migrate in different directions, both in relation to the cardinal (compass) direction and in relation to the position of the sun. This behaviour, which includes the ability to navigate, is similar to that of four winter-active collembolans, which also use the smooth snow surface for effective winter migration. Dissection of females collected on snow from October to April indicates that *Boreus* lays eggs throughout the winter. When the first batch of about 10-20 eggs have been laid during November, December and January, the ovaries start to produce new eggs and seem to have a continuous egg production until snow melt in April. Earlier studies have shown that eggs are laid among moss in the subnivean air space. Since copulation was very rarely observed on snow, this may occur during autumn before snow fall, or in the subnivean space. Under Norwegian conditions, *Boreus* is mainly a subnivean winter-active insect. However, in mild weather they climb along tree trunks etc. to reach the snow surface, probably for two purposes: to absorb heat for egg development and to migrate (spreading the eggs and perhaps bringing the animals to better feeding places). Sunny, cloudless weather may be risky due to a rapid temperature fall in the evening. It is suggested that continuous jumping as a migration behaviour may be a further evolution of jumping as an escape mechanism away from predators.

Key words: *Boreus*, winter activity, migration, egg-laying.

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