

# Biology and bioecology of *Nidularia balachowskii* Bodenheimer (Hem: Coccoidea: Kermesidae) scale insect in *Quercus* sp oak trees: Chalabeh region, Kermanshah

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**ABSTRACT:**

The *Nidularia balachowskii* (scale insect) is a member of the Kermesidae family which exclusively feeds on oak trees. This study was conducted on *Quercus branti* in Zagros forests during 2015 and 2016. The biological phases of the pest on twigs were individually collected, counted and recorded in the laboratory via stereo microscope. Given the average temperature and relative humidity of the region, this insect has first and second instar nymphs. It overwinters as young female, and fertile females appear on the first half of April. The dorsal side of second instar nymphs is adults is fully embroidered with an orderly mosaic design, created by the longitudinal and transverse grooves behind the body. Spawning takes place on the second half of April. The eggs are hatched during 10<sup>th</sup> to 20<sup>th</sup> of April and thus first instar nymphs appear. First instar nymphs move on the host in the hot weather of noon to search for a decent place. Often they choose the shaded area of twigs and trunks to locate, so as to protect themselves from the direct radiation of the sun. Second instar nymphs lived from May 5 to June 20, 2015. When the second instar nymphs turn into adults, their white waxy coating gradually molts. Young adult insects are convex, brown and embroidered in mosaic designs (resulting from longitudinal and transverse grooves in the lateral region of the back). They have a long lifespan and spend summer, fall and winter in a diapause state. In April of the following year, their bodies become bulky and gall-like and later begin to spawn. Population dynamic and spatial distribution of this insect are described using Taylor Power Law models and the Iwoa's Index.

**Keywords:**

Acorn, Biology, Population, *Nidularia*, Scale insects.