

## Molecular and morphological characterization of armored scale insects (Hemiptera: Diaspididae) and soft scale insects (Hemiptera: Coccidae) in Chile

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In Chile, 61 species of Armored Scale Insects (Hemiptera: Diaspididae) and 13 species of Soft Scale Insects (Hemiptera: Coccidae) are recorded up to now and some of them can cause economic impacts on agriculture and ornamental plants. Our objective was to describe the diversity of armored and soft scale insects present in Chile and provide molecular tools for future researches and to orientate the development of biocontrol methods in Chile.

In this study about 100 sites were sampled for scale insects on fruit trees (mainly avocados, citrus and olives trees), ornamental and endemic plants from Arica (18°S) to Frutillar (41°S) between January 2015 and February 2016. About 280 individuals of Armored Scales and 240 of Soft Scales were sequenced on parts of the COI mtDNA region and the 28S rDNA region. Selected individuals were then morphologically identified.

The list and the distribution of the species of scale insects in Chile were updated. We identified 20 species of Diaspididae and 11 species of Coccidae. The most relevant pests in the orchards were *Saissetia oleae* (Olivier) (Coccidae), *Aspidiotus nerii* Bouché, *Hemiberlesia rapax* (Comstock), *H. lataniae* (Signoret), *Aonidiella aurantii* (Maskell), *Diaspidiotus perniciosus* (Comstock), *Lepidosaphes beckii* (Newman) and *L. ulmi* (Linnaeus) (Diaspididae). The COI mtDNA revealed three divergent lineages of *A. nerii* which were not confirmed with the 28S rDNA. Two lineages of *H. rapax* were confirmed by the two markers. The black scale, *S. oleae*, was present from the first region (19°S) to the eighth region (36°S) of Chile while the hemispherical scale, *S. coffeae* (Walker), was only observed in the northern regions (18°S to 29°S). The COI mtDNA of the black scale showed haplotype diversity but without relationships with the localisation or the host-plant. In addition *Parasaissetia nigra* (Nietner) is first time recorded in Chile in this study.

Keywords: Diaspididae, Coccidae, genetic diversity, COI, 28S