

focus decrease so that higher magnifications have a limited use in the field.

## SCALES AND RELATED INSECTS

There are numerous scale insects which regularly or occasionally infest citrus. Several are of economic importance, but others are seldom sufficiently common to be considered as pests. Scales belong to the order Homoptera. For discussion purposes they will be divided into four groups: Armored scales, unarmored scales, cottony cushion scale and mealybugs.

### ARMORED SCALES

Two major citrus pests, purple scale, *Lepidosaphes beckii* (Newm.) and Florida red scale, *Chrysomphalus aonidium* (L.), are armored scales. These two species have been thoroughly discussed in two Florida Experiment Station Bulletins (15, 54). Therefore, the information presented on these two species will be brief. In addition to the two major pests, the following armored scales will be considered: chaff scale, *Parlatoria pergandii* Comst.; dictyospermum scale, *Chrysomphalus dictyospermi* (Morg.); yellow scale, *Aonidiella citrina* (Coq.); long or Glover's scale, *Lepidosaphes gloverii* (Pack.); snow scale, *Unaspis (Chionaspis) citri* (Comst.); and fern scale,<sup>2</sup> *Pinnaspis aspidistrae* (Sign.). All of these insects occasionally require control measures, and they may be of considerable importance in individual groves.

The armored scales are characterized by a waxy armor which is secreted by the insect. This is enlarged as the insect grows to maturity, and is the part usually seen by the citrus grower. It is actually not the insect itself, but rather a sort of house under which the insect lives. In order to determine if a scale insect is alive, it is necessary to turn the armor over and examine the insect underneath. In some instances (purple scale and chaff scale are good examples) a membranous sheath also is secreted underneath the insect so that it is almost entirely enclosed by a protective covering. Descriptions of scales are

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<sup>2</sup> Common name suggested by G. B. Merrill, former entomologist, Florida State Plant Board.