

Identifying Male California Scale Insects

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Annotation: The presence of dangerous coccids is a pervasive phenomenon in Uzbekistan. Of these, the Californian shield bug is classified as a quarantine pest. It causes extensive damage to a wide variety of plants. It causes damage to a wide range of crops, including apple, pear, plum, quince, peach, almonds, hawthorn, elm, poplar, and others. The first-instar diapausing larvae overwinter with a dark grey or black shield. In spring, the insect feeds intensively and molts, forming a shield similar to that of an adult female. Following the second molt, adult females are formed. After mating, the female spawns larvae of strollers, which spread along branches and leaves and can also settle on fruits, thereby initiating the next generation. This article will examine the means of distinguishing between the male and female California shield insects.

Keywords: coccids, male, California scale insects.

In the Stavropol Territory, representatives of three families of the suborder Coccidae live on fruit, forest and ornamental trees (Coccinea) – worms (family Pseudococcidae), false scale insects (Coccidae) and scale insects (Diaspididae). Special interracerepresents the familyDiaspididae, which includes a dangerous quarantine pest of gardens and parks - the Californian scale insect (Quadraspidotus destructive Comst.). Several species live in the region.non-quarantinespecies of

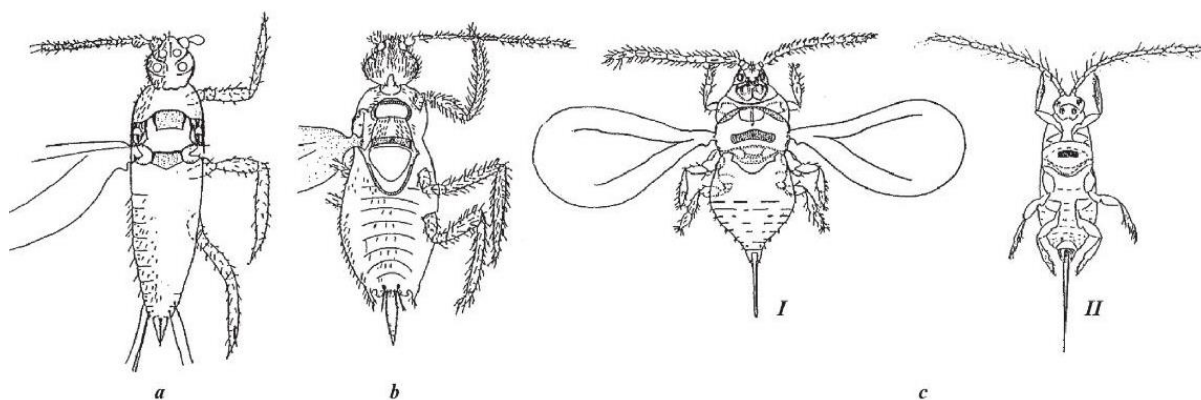
scale insects that can reproduce in more or smaller quantities. This is false California (Quadraspidotus oyster-shaped Curt.), poplar (Quadraspidotus gigas Thiem.), yellow pear (Quadraspidotus defiled Sign.), apple-comma-shaped (Lepidosaphes elms L.), red pear (Epidiaspis lepers Sign.), spruce (Nuculaspis you will go away Very.), willow (Chionaspis assembled L.) scale insects. It is very important to distinguish the quarantine species from non-quarantine. Males of the three families differ significantly from each other (Figure 1), it is more difficult to distinguish them within one family.

Table 1. The distinctive features of male shields

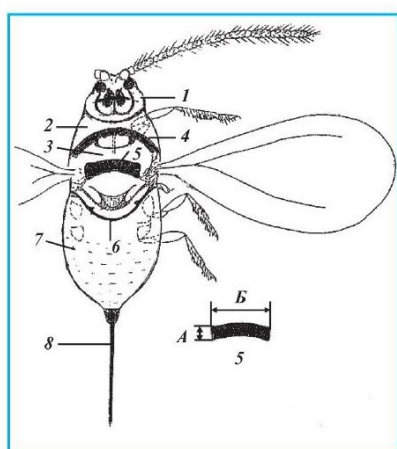
Type	Number of generations	The wintering stage	Summer time for males
Quadraspidotus perniciosus Comst.	2	Larva of the 1 st age	1 st flight – May, 2 nd flight – end of July – September
Quadraspidotus ostreaeformis Curt.	1	Larva of the 2 nd age	End of April - beginning of May
Quadraspidotus spurcatus Sign.	1	Larva of the 2 nd age	May
Quadraspidotus gigas Thiem.	1	Larva of the 2 nd age	End of April – 2 nd decade of May
Nuculaspis abietis Sehr	1	Larva of the 2 nd age	End of April – 2 nd decade of May
Lepidosaphes ulmi L.	1	Egg	July
Epidiaspis leperii Sign.	1	Female	August
Chionaspis salicis L.	1	Egg	June

For timely detection of the Californian scale insect, adhesive pheromone traps. Pheromones of this kind highly specific and do not attract other males. However, during mass breeding non-quarantine there are species of coccids the probability of their males being caught in traps pheromone Californian scale insect. According to the timing of the flight of males of these species (except for the willow shield that) partially coincides with the first or second flight of males Californian scale insects (Table 1)

Male red pear scale insects differ from males of the quarantine species when examining the catch under binoculars. They are wingless, have strong, developed legs, and are smaller in size. Male willow scale insects are also wingless, and their flight does not coincide with the flight of male California scale insects, and they can only fall into California scale traps in case those are not posted during. The males of the other species are winged and very similar, therefore, their identification is necessary. This is far from easy to do, since the insects are very small (about 1 mm), and when caught on pheromone traps for detection purposes, only the body can be used as traps, as more delicate parts (antennae, limbs, wings) remain on the adhesive surface.



1, Structurebodies of male coccids. a – family Mealybugs (Package, 1968); b – family False scale insects (Borchsenius, 1957); c – family Scale insects: I – winged male (Bushik, 1958), II – wingless male (Maksimova, 2006)



2. The structure of the male Californian scale insect:

1 – head, 2 –prothorax, 3 – mesothorax, 4 – prescutal it's wrong& ben, 5 – platescutum mesothorax(A – length, B – width), 6 –scutellum, 7 – abdomen, 8 –copulatorydevice (stylus)

Unfortunately, it was not possible to capture the remaining number of male yellow pear-shaped and apple-shaped shield beetles (only the parthenogenic form was found), therefore these species were not included in the study.

In order to identify differences between male California shield beetles and similar species captured on pheromone traps or bred, males freed from glue were cooked in 5% sodium hydroxide solution in a water bath and then washed in distilled water. They were placed in Fora-Berlese liquid and their body length, chest width, stylus length, and scutum plate length and width were measured using binoculars. Measurements were taken on 100 individuals of each species (see Figure 2 and Table 2). The measurements showed that the body length and width of spruce warbler and poplar warbler males were significantly greater than those of False California warbler and California warbler. The stylus size of males from different species was not consistent.

Table 2. The average body size of a male of similar shield species (mm)

Type	Body length without stylus	Chest width	The length of the scutum plate is medium-sized	The width of the scutum plate is medium-sized	The length of the stylus	The size of the shield of a young female
Nuculaspis abietis Sehr	0.91	0.34	0.040	0.17	0.28	1.8
Quadraspidiotus gigas Thiem.	0.86	0.35	0.035	0.19	0.35	2.2
Quadraspidiotus	0.69	0.27	0.027	0.14	0.30	2.0

ostreaeformis Curt.						
Quadraspidiotus perniciosus Comst.	0.64	0.28	0.023	0.14	0.26	1.5
Chionaspis salicis L.	0.44	0.22	0.022	0.07	0.29	1.8

Regarding the size of the middle-chest scutum, larger species such as spruce and poplar have larger scutum areas than smaller species like false California and California. The areas of the scutums of these species are 0.0068, 0.0066, 0.0038, and 0.0032 square millimeters, respectively. The smallest scutum area was found in the willow species (0.0015 square millimeters), which is likely due to the absence of wings in that species.

Table 3. Colour of sclerotised areas of the thorax of male shieldworms

Type	Prescutal ridge	Scutum plate of the median thorax	Scutellum
Nuculaspis abietis Sehr	Yellowish brown	Brown	Reddish brown
Quadraspidiotus gigas Thiem.	Yellowish brown	Brown	Reddish brown
Quadraspidiotus ostreaeformis Curt.	Brownish yellow	Light brown	Brownish yellow
Quadraspidiotus perniciosus Comst.	Light to dark brown	Dark brown	Light brown

The size of the body is directly related to the dimensions of the spruce shields. In larger species, such as spruce and poplar, the shield is on average smaller than that of false California.

There is a direct correlation between the length of the male styli and the size of the young female shield in different species. However, the length of the styli cannot be used as a definitive feature to distinguish between species.

List of references:

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