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EXTENSION

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Brown Garden Snail, *Helix aspersa* Müller (Gastropoda: Pulmonata: Helicidae)¹

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Introduction

The brown garden snail (European brown snail) *Helix* (*Cyptoomphalus*) *aspersa* Müller, was described by O.F. Müller in 1774 from specimens collected in Italy. This plant feeder has been disseminated into many parts of the world intentionally as a food delicacy, accidentally by the movement of plants, and by hobbyists who collect snails. It was introduced to California in the 1850s as a source of escargot. It has adapted well to California and is very troublesome as a pest of crops and ornamentals (Capinera 2001).

Snails belong to the class Gastropoda, and are related to the clams and oysters which belong to the class Pelecypoda. They prefer an undisturbed habitat with adequate moisture and good food supply. The snail body is protected by a hard shell, usually marked with spirals. Most land snails are nocturnal, but following a rain may come out of their hiding places during the day. They move with a gliding motion by means of a long flat muscular organ called a foot. Mucus, constantly secreted by glands in the

Figure 1. Adult brown garden snails, *Helix aspersa* Müller. Credits: Division of Plant Industry

foot, facilitates movement and leaves a silverlike slimy trail. The reproductive organs of both sexes occur in the same individuals and each is capable of self-fertilization, although cross fertilization is normal. Adults deposit eggs. Specimens are deposited in the Florida State Museum and the Florida State Collection of Arthropods.

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Distribution

Burch (1960) reports natural distribution in Britain, western Europe, and along borders of the Mediterranean and Black Seas. It has been introduced into the Atlantic Islands, South Africa, Haiti, New Zealand, Australia, Mexico, Chile and Argentina. In the United States, Capinera (2001) reports it in California and along the west coast north to British Columbia, Canada, in most southeastern states and along the east coast north to New Jersey. However, it has not developed the serious pest status found in California. Although occasionally intercepted on plant shipments to Florida, it has not become established in this state.

Description

Shell large, globose, rather thin, imperforate or nearly so, moderately glossy, sculptured with fine wrinkles. It is yellow or horn-colored with chestnut brown spiral bands which are interrupted by yellow flecks or streaks. The aperture is roundly lunate to ovate-lunate, the lip turned back. Adult shells (four to five whorls) measure 28 to 32 mm in diameter (Burch, 1960).

Figure 2. Various stages of development of the brown garden snail, *Helix aspersa* Müller. Specimen at left is fully mature. Credits: Division of Plant Industry

Figure 3. The brown garden snail, *Helix aspersa* Müller, showing yellow coloring. Credits: Division of Plant Industry

Life History

Mating requires four to 12 hours. Oviposition occurs three to six days after fertilization. White spherical eggs about 1/8 inch in diameter are deposited in a nest constructed by the snail, which uses its foot to shovel soil upwards. The nest is about 1 to 1 1/2 inches deep. Basinger (1931) reported that the number of eggs laid during each oviposition averaged about 86. The egg mass is concealed by a mixture of soil with secreted mucus followed by a quantity of excrement. The number of eggs deposited at one time varies from 30 to 120, averaging 86 (Capinera 2001).

Frequency of oviposition is subject to temperature, humidity, and soil conditions. Low temperature and low humidity inhibit the activity of the snail, and dry soil is unsuitable for the preparation of a nest. During warm damp weather, ovipositions may be as frequent as once a month. Low humidity and cold temperatures greatly inhibit the activity of the snails during the fall and winter months. If each individual is capable of laying eggs once every six weeks from February to October, then approximately five ovipositions are made each year and 430 eggs laid (Basinger, 1931).

During the summer months, the eggs hatch in about two weeks. The shells of hatchlings are fragile and translucent. Maturity requires about two years in southern California. In South Africa the snails take about 10 months to become mature, producing one generation a year (Gunn, 1924). When dry conditions prevail, the snail may seal itself to various objects or close the shell opening with a parchmentlike epiphragm. With the advent of humid conditions, the snail again becomes active.

Brown garden snails attain a diameter of 16 to 20 mm within one year, but 26 to 33 mm by the second year. These snails are nocturnal and feed on organic matter in the soil, bark from trees and especially on vegetation. Nearly anything growing in a vegetable or flower garden can be consumed. They normally feed only within the temperature range of 5 to 21 degrees C (Capinera 2001).

Hosts

Buxus microphylla 'Japonica' (California boxwood), *Crinum* sp., *Cupressus sempervirens* L. (Italian cypress), *Grevillea* sp., *Hibiscus* spp., and *Juniperus* spp., *Rosa* sp., and other unidentified plants and shrubs at the Davie, Florida, infestation (1969). Gunn (1924) listed 49 plants as hosts in South Africa: Vegetables: cabbage, carrot, cauliflower, celery, bean, beet, brussels sprouts, lettuce, mangel, onion, peas, radish, tomato, and turnips. Cereals: barley, oats, and wheat. Flowers: alyssum, antirrhinum, aster, balsam, carnation, candytuft, chrysanthemum, dianthus, dahlia, delphinium, hollyhock, larkspur, lilies, marguerite, mignonette, nasturtium, pansy, pentstemon, petunia, phlox, stock, sweet-pea, verbena, and zinnia. Trees: apple, apricot, citrus, peach, and plum. Shrubs: hibiscus, magnolia, and rose.

Economic Importance

Snails feeding on cultivated plants may become serious pests. In California, enormous populations sometimes become established in citrus groves and cause serious damage to leaves and fruit (Basinger 1931). They also cause economic damage to truck crops and ornamental plants. Large numbers of snails are a nuisance around a residence.

Management

Management of the brown garden snail is a four-step process that involves pruning tree skirts ; banding tree trunks with copper foil or a basic copper sulfate slurry; putting out poison bait to reduce their populations; and making releases of the predatory decollate snail, *Rumina decollata* (UC/IPM 2000).

Habitat reduction will aid in control. Remove anything snails may hide under: boards, bags, brush and debris. During the night, place a board on the ground near damaged plants. Elevate the board with four stones placed under the corners. The snails will take shelter under the board in the morning and can be removed and then destroyed then by dropping into a jar filled with water and a little rubbing alcohol. Some birds, especially ducks, will feed on these snails. (Garofalo 2001).

Figure 4. Infestation of brown garden snail, *Helix aspersa* Müller, on a citrus tree in California. Credits: Division of Plant Industry

Barriers of diatomaceous earth, sand or ashes provide only temporary control. With a beer trap the goal is to trap and drown snails and slugs in a shallow dish with beer placed slightly below grade so that the lip of the dish is even with the soil. However, this does not provide reliable control (Bradley 1999).

For more management information please see:

Insect Management Guide for Landscape Plants (<http://edis.ifas.ufl.edu/IG013>)

Insect Management Guide for Vegetables (http://edis.ifas.ufl.edu/TOPIC_GUIDE_IG_Vegetables)

Insect Management Guide for Citrus (http://edis.ifas.ufl.edu/TOPIC_BOOK_Florida_Citrus_Pest_Management_Guide)

Insect Management Guide for Fruit (http://edis.ifas.ufl.edu/TOPIC_GUIDE_IG_Fruit_and_Nuts)

Remarks

The brown garden snail has been eradicated from at least two locations in Florida since 1963 by the Division of Plant Industry. Most infestations are believed to be introduced on shipments of container-grown plants from California.

Due to the brown garden snail, various states in the United States have quarantine restrictions concerning plant materials brought in from other states. The states under quarantine include Arizona, California, Louisiana, Oregon, South Carolina and Washington.

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