

White Garden Snail, *Theba pisana* (Müller) (Gastropoda: Helicidae)¹

Jane E. Deisler, Lionel A. Stange, and Thomas R. Fasulo²

The Featured Creatures collection provides in-depth profiles of insects, nematodes, arachnids and other organisms relevant to Florida. These profiles are intended for the use of interested laypersons with some knowledge of biology as well as academic audiences.

Introduction

The white garden snail, *Theba pisana* (Müller), is the worst potential agricultural pest of the helcid snails introduced to North America (Mead 1971). It is the most frequently intercepted foreign land snail (Hanna 1966; Mead 1971), generally arriving in shipments from Mediterranean countries. *Theba pisana* shows a strong proclivity for climbing up and into freight for aestivation and is difficult to detect. This snail can survive long and arduous journeys because of its ability to form a wall of dried mucus, called an epiphragm, in the aperture of its shell, which reduces water loss during dormancy.

Theba pisana is capable of explosive reproductive rates where it has been introduced and can be found in densities of up to 3000 snails per tree (Mead 1971) after periods of less than five years (Chace 1915; Orcutt 1919). Once established, *Theba pisana* causes severe defoliation of a number of plants, including citrus and ornamental plantings (Orcutt 1919; Pilsbry 1939; Abbott 1950; Dekle 1962; Hanna 1966;

Mead 1971). *Theba pisana* was previously known as *Helix pasana* (Müller).



Figure 1. The white garden snail, *Theba pisana* (Müller).
Credits: Esculapio

Distribution

Theba pisana is native in the Mediterranean countries of Europe, Africa, and the Mid-East (Pilsbry 1939; Burch 1960). The type locality is Italy. Its habitat in Europe is near the coasts of Belgium, southwestern England, and south Wales, east and south Ireland, western France, Netherlands, Portugal, and Spain (where it is occasionally found in the interior) (Kerney and Cameron 1979; Schultes 2011). It has been introduced into the central Atlantic islands, Africa (Somaliland, South Africa), and southeastern Australia (including Tasmania) (Schultes 2011).

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2. Jane E. Deisler, museum curator, Corpus Christi Museum; Lionel A. Stange, Florida Department of Agriculture and Consumer Services, Division of Plant Industry; and Thomas R. Fasulo, retired scientist, Department of Entomology and Nematology; UF/IFAS Extension, Gainesville, FL 32611.

This snail was first noticed in North America in La Jolla, San Diego County, California, in 1914 (Chace 1915; Basinger 1923). It is established only in San Diego County but has been reported in both Los Angeles and Orange Counties (Flint 2011). Mead (1971) reported an infestation in Los Angeles County in 1966, which was declared eradicated in 1972 (William A. Edwards, personal communication). The snails were found and identified in August 1985, in San Diego, California, at several localities in about a 10 square mile area. Hanna (1966) stated that *Theba pisana* has been introduced into several eastern localities in the United States. However, there are no published records for North American populations outside of California. *Theba pisana* is also present in Bermuda, but has never been recorded from Florida.

Identification

The shell is subglobose with a moderately depressed spire. The adult shell has 5.5–6 slightly convex whorls with shallow sutures. It is of medium size, ranging from 12 to 15 mm ($\sim\frac{1}{2}$ in) (rarely to 25 mm (1 in)) in diameter and 9 to 12 mm ($\sim\frac{1}{3}$ to $\frac{1}{2}$ in) (rarely to 20 mm ($\sim\frac{3}{4}$ in)) in height, and is opaque and moderately solid. The umbilicus is narrow and partially to entirely covered by an expansion of the columella. The aperture of the shell is rounded and lunate and only slightly oblique. The lip of the aperture is sharp and unreflective, but some specimens show a thickening inside the lip. The juvenile shell has a sharp keel at the periphery, but in the adult shell the periphery is only slightly shouldered. The surface of the shell is not glossy but is marked with many fine vertical striae. The background color of the shell is nearly always ivory white (rarely pink), and there are often a variable number of narrow dark-brown spiral bands present. These bands may be solid, made up of dots and dashes, or absent. This difference in coloration does not have any systematic significance because it is apparently a polymorphic trait subject to differential selection pressures and it correlates with microhabitat (Johnson 1980). The first $1\frac{1}{2}$ whorls are generally dark in color, ranging from tan to dark brown, and give the appearance of a dot on the apex of the shell.

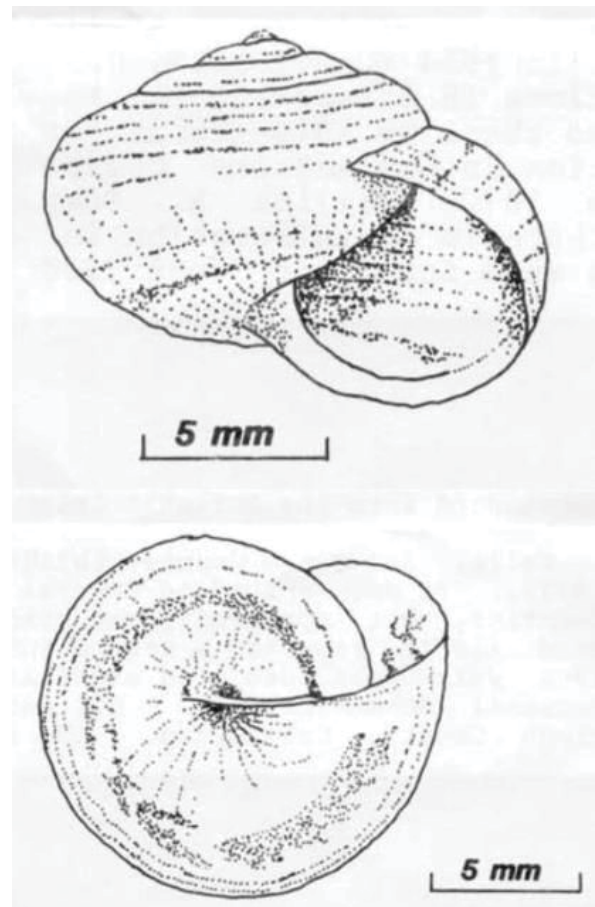


Figure 2. Front (top) and basal (bottom) views of the white garden snail, *Theba pisana* (Müller).
Credits: Division of Plant Industry



Figure 3. Brown banded color form of the white garden snail, *Theba pisana* (Müller).
Credits: Division of Plant Industry



Figure 4. Dots and dashes color form of the white garden snail, *Theba pisana* (Müller).

Credits: Division of Plant Industry

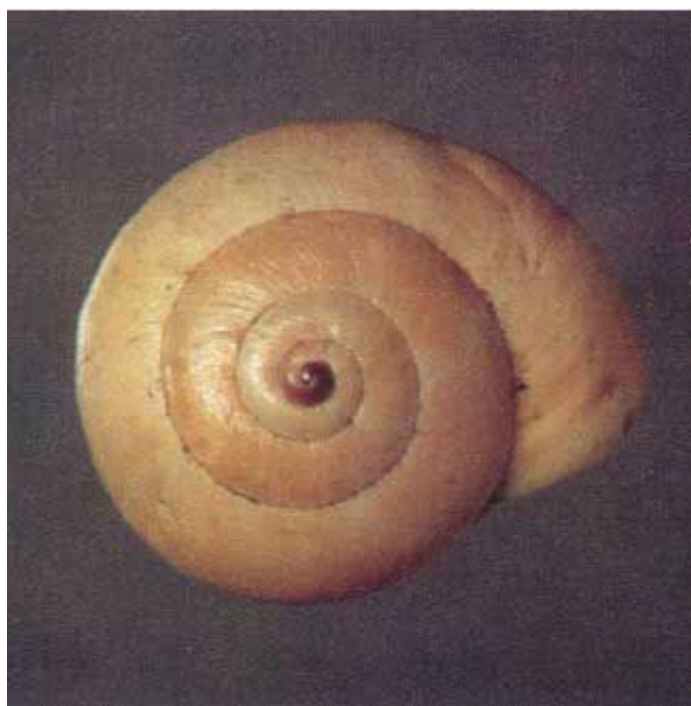


Figure 6. Non-banded color form of the white garden snail, *Theba pisana* (Müller).

Credits: Division of Plant Industry



Figure 5. A lighter dots and dashes color form of the white garden snail, *Theba pisana* (Müller).

Credits: Paul M. Choate, UF/IFAS



Figure 7. White garden snails, *Theba pisana* (Müller), aestivating at the top of a fence post at Kadina, South Australia.

Credits: Vladimir Menkov

Biology

During dry weather, most slugs and snails aestivate (become inactive) hidden under logs or stones or buried in the earth. However, *Theba pisana* aestivates in the open on trees, fences, and other vertical surfaces. Pilsbry (1939) reported that *Theba pisana* mates after rains during early

November in California. Like all helicid snails, *Theba pisana* is a cross-fertilizing hermaphrodite. The eggs are deposited several inches in the ground a few weeks after mating. Hatching occurs after a minimum of 20 days but may occur later during dry weather. In the active season, this snail partially defoliates a variety of shrubs and trees, including citrus. The great density of the populations in California (up to 3000 snails per tree) and the rapid rate of reproduction are primary factors in making this snail a major pest (Mead 1971).

Survey and Detection

Searches should be directed to plants, fences, and other vertical surfaces in nature, especially in sandy areas. Crates shipped from areas where the snails are known to exist should be examined, especially the lids and corners.

Management

Past infestations of *Theba pisana* in California have been controlled and eventually eradicated by the combined use of chemical sprays, chemical baits, burning, and hand-picking (Basinger 1927; Pilsbry 1939; Flint 2011). These campaigns were invariably long and costly due, in part, to the way in which this snail hides itself for long periods by climbing up, on, and into bushes, trees, and man-made objects. Current recommendations include a variety of methods: cultural and mechanical methods, such as eliminating places to reduce concentrations that can more easily be checked, handpicking, traps and barriers; biological control with [predatory snails](#); and chemical baits, which, unfortunately, are toxic to all snails and slugs (Flint 2011).

Any control program in Florida would require the use of all the above in conjunction with detailed surveys of the ground, plantings, and structures within the infested areas. The use of herbicides may be necessary in overgrown areas. Mead (1971) recommends rigid quarantine and fumigation of all suspect shipments.

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