Florida Cooperative Agricultural Pest Survey Program

Milk Snail Survey, *Otala lactea*, in Nassau County, Florida March 2003

Division of Plant Industry
Florida Department of Agriculture and Consumer Services
PO Box 147100
Gainesville, FL 32614

Charles Bronson
Commissioner of Agriculture

Richard Gaskalla
Division Director

Milk Snail Survey

Introduction

The milk snail, *Otala lactea*, Helicidae (Order: Stylommatophora, Class: Gastropoda) is a land snail native to Algeria, Morocco, southern Spain, and the Canary Islands. It is now also found in North and South America. The Milk Snail is edible and considered a prized delicacy in many Mediterranean countries. Another common use for the milk snail is as fish bait. If not transported for consumption by man or fish, it has become widely distributed through the pet trade, pet-keepers known to refer to *Otala lactea* as the "bejeweled creeping beauty."

History in Florida

The milk snail was first detected in Florida in 1931. Although it has not been known to cause serious damage in Florida, *Otala lactea* is considered a pest in California and has also established itself in Arizona, Mississippi, and Georgia. It has been found on several plants and crops. Milk snail in Florida has been found in Nassau County on Amelia Island since the 1970s (F.Podris pers.comm.) and Pinellas County in a few locations since the late 1930s. In Florida, it can usually be found on *Crinum asiaticum* L. (Crinum Lily) and *Zebbina pendula* (wandering Jew) in Florida. It has also been intercepted on anise, broccoli, cabbage, cauliflower, celery, lettuce, castor, papaya, and chard. It usually feeds on detritus rather than healthy plant material. Thus the milk snail has not been found to cause serious damage. Because it is adapted to an arid environment, it reacts to high humidity levels and is active after it rains. The milk snail aestivates on trees, rocks, and other similar surfaces. It deposits its eggs in loose soil and generally lays forty to sixty eggs twice per month.

A thorough survey (and eradication) of the milk snail population on Amelia Island commenced in 1993 and was conducted again in 1994, and 1995. The surveys were interrupted due to staff needs for citrus canker survey efforts and then resumed again in 2000. Table 1 shows the results from milk snail surveys on Amelia Island and St. Petersburg Beach, Florida between1993 and 2003.

The data assembled in Table 1 is taken from reports filed with DPI. No reports were located for the survey done in 1994, however the chart shown in Figure 1. Monthly Milk Snail Collections shows data from that year. During each survey collection of live snails were done for eradication purposes. The chart (Figure 1) reflects that the population in 1994 was quite high in March/April and then at marked low point in November of 1994. Already by 1995 the population seems to be increasing again.

The following table shows the result of surveys done in 2000, 2001 and 2002. Exact figures for number of snails collected is not given so we cannot compare population size, however a location of snail distribution is accurately reflected herein.

Table 2. Survey results from recent milk snail surveys at Amelia Island, Florida 2000-2002 where (+) = live individuals found and (-) = no live individuals found.

Addresses surveyed on Fletcher Drive	Date of Survey 9/21/2000	Date of Survey 9/10/2001	Date of Survey 11/26/2002
1144	+	-	
1130	+		
1122	+		+
1110	+		+
1100	+		+
1098	+		+
1088	+		+
1076	-		
1066	-		
1060	-		
1048	-		
1028	-		
1000	-		
?	-	-	
982	-	-	

Survey on March 7, 2003

A survey of the Milk snail population in Amelia Island was conducted on March 7, 2003 by CAPS staff, including: Stefanie Krantz, Eric Stone, Diane Baruch, Yvette Ogle and the DPI Inspector for Nassau County, Flewellyn Podris.

Purpose: The purpose of the survey was to monitor this population, to compare its current status with prior survey data, and to give the CAPS staff an opportunity to review its survey procedures.

Survey Site: Surveys were conducted on properties located on Fletcher Avenue, Amelia Island, Nassau County, Florida (3039.0839,N,08126.0545,W). Fletcher Avenue parallels the coastline and is dominated by rental properties and private residences. The vegetation in this area consists of ornamental plants, lawns and highly disturbed coastal scrub and dune communities.

Procedure: Records from previous milk snail surveys on Amelia Island were reviewed to determine the historic distribution of the milk snail population. This was confirmed with the Nassau County Agriculture Inspector, Flewellyn Podris, who met the CAPS team at the site. Previous surveys revealed that the Amelia Island milk snail population was restricted to the East side of Fletcher Avenue and was found at the addresses listed in Table 2. According to Flewellyn, in 2002 the epicenter of the Amelia Island milk snail population was at 1122 Fletcher Avenue on a patch of *Crinum asiaticum* or Asiatic

Poison Lilies. This address was near the Southern extent of the historic population of milk snails. In previous years, surveys were started at the Northern end of Fletcher Avenue. We decided to start the survey at the South end of Fletcher Avenue near 1122 and work north. Vegetation and walls on each property from 1144 Fletcher to 982 Fletcher were carefully examined for live snails. All live snails encountered were collected, counted, recorded and destroyed. Photos and GPS coordinates were taken at 1122 Fletcher as this was the largest population found.

Results: Table 3 shows the results of the visit on March 7, 2003. Ten residences were surveyed. These residences were all located on the east side of Fletcher Avenue. Out of the 10 residences only 2 sites yielded positive live snail counts. All other addresses had a few empty shells and were given a Live Snail Count of 0 on the table showing results, Table 3. At the 1122 Fletcher Avenue residence 351 live snails were captured, counted, and destroyed. At the 1100 Fletcher Avenue residence 2 live snails were captured, counted, and destroyed. Residence 1100 Fletcher Avenue is immediately adjacent to the 1122 Fletcher Avenue. The large outlier of 351 live snails captured at the residence 1122 Fletcher Avenue were all located on the patch of *Crinum asiaticum*. Only one accurate GPS coordinate could be captured. The GPS point was captured at 1122 Fletcher Avenue immediately adjacent to the *Crinum asiaticum* on the property. This GPS point was assigned to all of the addresses, as it is the nearest accurate reference to those points.

TABLE 3

Results of Amelia Island Milk Snail Survey, 2003

Residence # on Fletcher Avenue	GPS Coordinates (North Latitude, West Longitude)	# of Live Snails
982	3039.0839,N,08126.0545,W	0
990	3039.0839,N,08126.0545,W	0
1000	3039.0839,N,08126.0545,W	0
1028	3039.0839,N,08126.0545,W	0
1046	3039.0839,N,08126.0545,W	0
1076	3039.0839,N,08126.0545,W	0
1088	3039.0839,N,08126.0545,W	0
1098	3039.0839,N,08126.0545,W	0
1100	3039.0839,N,08126.0545,W	2
1122	3039.0839,N,08126.0545,W	351

Figures 1 & 2

Amelia Island Photos

Figure 1:Live Milk Snail

Figure 2: 1122 Fletcher Ave Survey Site

Conclusion: The population of *Octala lactea* on Amelia Island is still present. The total number of snails captured in this survey was 353. This is lower than the last year for which we have figures; 547 in 1995. A count was not done in the 2000 to 2002 surveys we are unable to make a determination of population dynamics factoring in these years, only that it continued to be present and appeared to be more widely distributed (5 residences) than it is now in 2003 (2 residences). Population highs seem to occur in the spring (March/April) of 1994 and 1995 (see Table 4). It appears that the spring survey of 1994 had approximately 800 individuals and the spring survey of 1995 had 547 individuals. Thus, by a slim margin of 194 individuals the population count is lower this year than in 1995 and more restricted in distribution from 2003.

The population may be decreasing and shrinking in distribution. However, given data from prior years we see a tendency for this population to increase if not monitored and controlled on a regular basis. A regular monitoring regime is recommended to better control this population. Contacting landowner to discuss the snail's presence and to seek solutions for its eradication could be more effective in truly eradicating it in the future.

Survey on March 13, 2003

Purpose: The purpose of the survey on March 13th was to document the occurrence of milk snail at St. Petersburg Beach in Pinellas county and several historically known locations south of there. Eradication, as well was part of the protocol for the survey

Survey Sites: The survey was conducted at several locations (see Figure 3, *Map of Milk Snail Survey March 2003*). The first stop was at Pass-a-Grille on St. Petersburg Beach in Pinellas county. Commencing at the southern terminus on the Gulf side of the peninsula (#105 Gulfway-Lat.27 N, Long.82 W.), we surveyed north until 20th Avenue. On the Bay side of the peninsula our survey started at the southern terminus (#5, Lat.27 N., Long. 80, W) and continued north until 16th Avenue. Next we inspected the Pinellas Bayway (rte. 682) and the Pinellas Bayway (rte. 679) to the end at Fort Desoto.

Procedure:
Commencing at the southern terminus on the Gulf side of the peninsula (#105 Gulfway-Lat.27 N, Long.82 W.), we surveyed all crinum lilies, plant pots, and undersides of house ledges going northward until 20th Avenue. On the Bay side of the peninsula we survey in the same manner, starting at the southern terminus (#5, Lat.27 N., Long. 80, W) going northward until 16th Avenue. Next we inspected the Pinellas Bayway (rte. 682) and the Pinellas Bayway (rte. 679) to the end at Fort Desoto. We stopped at the large stretch of Castor shrubs (*Ricinus communis*) along the eastern side of the Pinellas Bayway south of Tierra Verde. Farther along the peninsula we surveyed several checkpoints on Anderson Boulevard and farther still on the causeway known as Mullet Key, then on to the visitor center at Fort Desoto. Here we surveyed plants at the visitor center as well as along the dune area and the scant woods near the center.

Results: A total 18 snails were encountered during this survey. There were four adults and fourteen juveniles. They were collected and destroyed. The entire population was

found in one location at # 5 Pass-a-Grill Channel way (Lat.27 N., Long. 80, W) on crinum lilies. At all other stops no snails were encountered.

Conclusion: While the one milk snail population encountered during this survey was small we can conclude that they are still present at Pass-a-Grille and that they are reproducing. While no milk snails were encountered at the other areas surveyed we cannot presume it reasonable or accurate to say that milk snails no longer occur at these locals. A longer and more thorough survey would be needed for a conclusive determination to be made.

Discussion: The occurrence of milk snail (*Octala lactea*) is still a concern in Florida. Even though it has not been demonstrated to cause plant damage but rather to be a detritus feeder, its populations have historically gotten high. The Amelia Island population seemed to reach its zenith in October of 1993 (see Table 4, *Ten Years of Survey Results from Milk Snail Surveys in Florida (1993-2003*). Through survey efforts coupled with eradication the population dove markedly to a low almost a year later in November 1994. Only the Amelia Island population has sufficient data to show the effectiveness of eradication efforts.

We have interception records from the Tampa Bay corridor but no actual count records (see Table 5, *25 Years of Milk Snail Data for Florida (1963-1988*). These records are useful for demonstrating location patterns and areas of potential alert. A reinvestigation of these areas should be conducted. Included in the interception records is one for Panama City in Bay County of the Florida Panhandle. Investigations should be made to determine the occurrence of milk snail in the Panhandle region as well.

Recommendation is being made for a two-pronged strategy in monitoring, surveying and eradication efforts regarding milk snail in Florida. Firstly, follow-up surveys should be done at all historically known locations. The second approach is to focus monitoring efforts on initial pathway routes such as tile cargo coming from Europe. Future surveys can be conducted at tile warehouses in the state especially at significant cargo port/entry areas such as Miami, Fort Lauderdale, Orlando, Jacksonville and Pensacola.

Table 4

Ten Years of Survey Results from Milk Snail Surveys in Florida (1993-2003)

Survey	Year	Month	Location	Number of Snails	%change	Eradication
1	1993	August	Amelia Island	256		attempted
2		September	Amelia Island	572	123.4% +	attempted
3		October	Amelia Island	2452	328.6% +	attempted
4		November	Amelia Island	825	66.3% -	attempted
5	1994	February	Amelia Island	700	15.1% -	attempted
6		March	Amelia Island	1025	46.4% +	attempted
7		April	Amelia Island	1450	41.4% +	attempted
8		May	Amelia Island	1250	13.8% -	attempted
9		June	Amelia Island	1025	18.0% -	attempted
10		July	Amelia Island	250	75.6% -	attempted
11		August	Amelia Island	150	4.0% -	attempted
12		September	Amelia Island	100	33.3% -	attempted
13		October	Amelia Island	75	25.0% -	attempted
14		November	Amelia Island	50	33.3% -	attempted
15	1995	January	Amelia Island	125	150.0% +	attempted
16		February	Amelia Island	125	0%	attempted
17		March	Amelia Island	400	220.0% +	attempted
18		April	Amelia Island	547	36.7% +	attempted
19		May	Amelia Island	341	37.6% -	attempted
20		June	Amelia Island	142	58.3% -	attempted
21	1996-1999	No Data	Amelia Island	No Data		
22	2000	August	Treasure Island	Present		unknown
23	2001	October	Amelia Island	Present		unknown
24	2002	November	Amelia Island	Present		unknown
25	2003	March	Amelia Island	353		attempted
26	2003	March	St. Pete. Bch.	18		attempted
27	2003	April	St. Petersburg	Present		unknown

Table 5

25 Years of Milk Snail Data for Florida (1963-1988)

#	Year	Month	Location	County	Collector and Notes
1	1963	March	Pine Key Tierra Verde-Port-o-call	Pinellas	E.H.Fredric. Weeds and grass. Across channel from Pass-a-Grille, .5mi. So. Of Guy. Med to heavy infestation.Routine
2	1964	August	Salvatore Falcone&Sons, 5609 NW 7th Ave	Miami-Dade	C.K.Hickman. Imported for food. Snails were alive when collected. Imported by Salvatore Scozzaro, Store #40, Brooklyn Terminal Mkt, New York.High priority/urgent
3	1969	December	8thAve Castilliano & Pizzo, YborCity	Hillsborough	C.Poucher.Snails were being sold alive for 80cents/lb.
4	1971	January	Tierra Verde	Pinellas	C.K.Hickman. .25mi. NW of 7-11 Store, under misc.weeds. Snails were fnd here in same place 10 yrs ago.Routine
5	1971	November ?	Near Anna Maria Is.	Manatee	LW Wiley(of 1218 18th St.W.Bradenton).Routine
6	1973	February	Tierra Verde	Pinellas	LBHill & GWJohnson.Grass,grounds, shrubs, north and east of golf course.Routine
7	1973	February	Tierra Verde	Pinellas	LBHill & EWMiller.Misc plants, north of golf course.High priority/urgent
8	1974	April	Tierra Verde	Pinellas	EWMiller.Routine
9	1979	May	2451E Vina Del Mar Blvd, St.Petersburg Beach	Pinellas	K.Hickman(207).*Citrus mitis Blanco* (Calamondon).Fnd. On lwr tree trunk. Small colony known for years at T.Verde which appeared stationary but this could be a potential serious problem….Acad. Int.
10	1979	October	Pass-a-Grille	Pinellas	K.Hickman(207) & L.Stange.Downtown. On leaves of Crinum lily. Young snails scraping lvs.Academic Interest
11	1980	July	Tierra Verde	Pinellas	K.Hickman (207) *Citrofortunella mitis (Blanco).* Milk snail? This location @a mile from where it had previously been fnd. Routine
12	1981	June	Delta Air Cargo Orlando	Orange	W Shirley(217). Snail fnd alive but not in box nor on host plant.Fnd at Delta Air Cargo Terminal. High Priority/urgent
13	1981	September	420 4th Ave N, Tierra Verde	Pinellas	K Hickman (207). Citrofortunella mitis (Blanco). Milk snail?One found. Routine
14	1981	June	Residence of Ron Shultz, St.Petrbrg	Pinellas	E W Miller. Was reported as Giant African snail. High priority/urgent
15	1982	August	4510 Gulf Blvd. St.Petersburg	Pinellas	K.Hickman (207).On bark of *Casuarina sp*. Australian Pine.This location @2-3 miles from where it had previously been fnd. Routine

#	Year	Month	Location	County	Collector and Notes
16	1984	February	3616 El Centro St.Petersburg Beach	Pinellas	K.Hickman (207). On soil & bldgs. Some look different than milk snail.They have fragile shell. Variable coloration only mature adults w/hard shells.High priority/urgent
17	1984	May	Parovi Shipping Co. Dodge Is. Miami	Miami-Dade	L.Chang(317).Fnd on outside of container on SS Triglav from Italy. Cargo of tomato paste.Container fumigated w/MB.High priority/urgent
18	1984	August	Port of Miami	Miami-Dade	A.Chavis(usda).*Pants* (?) Snail id by D DeWeese as *Otala vermiculata*.High priority/urgent
19	1988	June	Garden Bay Apt.A2, 924 Florida Ave. Leonard Bergon Panama City	Bay	L.Smith(115), L Stange & J Wiley.*Thuja orientalis* arbor-vitae. Fnd in pine straw litter under plant.High priority/urgent