

wavy turban snail

BIOLOGY FACT SHEET

Megastaea undosa



http://www.losserenos.com/abcov_photos/21.jpg

San Diego seafood profiles

Taxonomic description

- Heavy, sculptured shell with undulating ridges [2]
- Flat shell base; the operculum is hard, thick, oval, and uncured, with well-defined, rough ridges [1]
- The light brown or tan shell color is caused by the fibrous periostracum cover [1]
- Periostracum is covered with coralline algae and other epiphytes [1]
- Shells can grow up to six inches in diameter [1, 2]

Distribution

- From Point Conception and the coastal Channel Islands to northern Baja California, Mexico [2]

Life history

- Reproduces year-round with major peaks in spring and fall [1]

- Three reproductive phases during the year; gonad growth and maturity during spring and early summer, followed by spawning in late summer [1]
- Recruitment of new juveniles observed from January to April [1]
- Growth rate is higher in smaller sized snails and gradually slows down [1]
- Low growth period in spring and summer months, high growth period in fall and winter months [1]
- Females grow slower than males [1]

- Feed on kelp and coralline algae [1]
- Predators include sea stars, Kellet's whelks, octopuses, and lobsters [1]

References

- [1] Taniguchi, Ian, and Laura Rogers-Bennet, California Department of Fish and Game. 2001. California's Living Marine Resources: A Status Report, pgs. 140-41. Available: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=34371>
- [2] NOAA Encyclopedia of the Sanctuaries. "Wavy Turban Snail." Available: <http://www8.nos.noaa.gov/onms/Park/Parks/SpeciesCard.aspx?refID=4&CreatureID=132&pID=3>

Did you know?

The shells of wavy turban snails are used to make buttons! [1]

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FISHERY FACT SHEET

Megastaea undosa



<http://thdocksidemarket.com/new/#gear>

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Seasonal availability

- Available year-round [4]

Managing authority

- Regulated by the California Fish and Wildlife Department under the Invertebrate Management Project [1]
- Commercial tidal invertebrate regulations prohibit harvest of any snail species within 1,000 feet of low tide mark on shore [1, 3]
- Simply need a valid California commercial fishing license to harvest the snails [3]

Gear type

- Typically harvested by divers [3, 5]
- Divers use handheld tools and net bags to collect the snails, gear which is identical to that used to collect red sea urchins [3, 4]
- Snails are hand-picked by divers, resulting in very little (or no) bycatch [4]
- Divers make little contact with the seafloor [4]

Did you know?

The wavy turban snail's meat is similar in taste and texture to abalone, which is why it is sometimes processed and sold as "wavalone"! [3]

Status of the fishery

- Recorded landings began in 1992, with overseas markets for the meat and the shell [3]
- Landings peaked in 1993, but crashed in 1994 after market demand plummeted; landings continued to fluctuate from 1995-97, and peaked again in 1998 [3]
- Fishery centered in San Diego, with most landings coming from Point Loma [3]

Potential ecosystem impacts

- Because wavy turban snails are hand-picked by divers, the fishery is at low risk for bycatch [4]
- Wavy turban snails are abundantly available and have a high productivity rate, so over-harvesting is less likely [2]
- El Niño-Southern Oscillation (ENSO) events seem to trigger recruitment, and increase mortality of larger individual turban snails; this suggests that knowledge of ENSO will be helpful in setting harvest quotas in the future [6]
- Impacts of harvesting wavy turban snails may cascade upward to their predators, like the giant-spined sea star (*P. gigantus*) [6]

References

- [1] California Department of Fish and Wildlife. 2015. Invertebrate Management Project. Available: <https://www.wildlife.ca.gov/Conservation/Marine/Invertebrates>
- [2] Micheli, F., et al. 2014. A risk-based framework for assessing the cumulative impact of multiple fisheries. *Biological Conservation* 176: 224-235. Available: <http://micheli.stanford.edu/pdf/a%20risk%20based%20framework.pdf>
- [3] Taniguchi, Ian, and Laura Rogers-Bennet, California Department of Fish and Game. 2001. California's Living Marine Resources: A Status Report, pgs. 140-41. Available: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=34371>
- [4] Tuna Harbor Dockside Market. 2015. Gear. Available: <http://thdocksidemarket.com/new/index.html#gear>
- [5] Tuna Harbor Dockside Market. 2015. Species. Available: <http://thdocksidemarket.com/new/#species>
- [6] Zacharias, Mark, and David J. Kushner. 2006. "Sea temperature and wave height as predictors of population size structure and density of *Megastaea* (*Lithopoma*) *undosa*: Implications for fishery management." *Bulletin of Marine Science* 79.1: 71-82.

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NUTRITION FACT SHEET

Megastaea undosa



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Edible portions

- Current market demand is for the foot [6]
- The operculum should be removed [2]
- The snail's intestines are bitter in taste, and are sometimes eaten, sometimes removed [2, 3]

Description of meat

- Has an abalone-like texture and taste; foot of the snail is processed and sold to restaurants as an abalone-like product, "wavalone" [6, 3]

Culinary uses

- Most recipes for abalone and sea snails can be adapted to the wavy turban snail
- Wavy turban snails can be prepared many ways: grilled, sautéed, battered and fried, in pastas, in chowders and soups, and in stir fries [4]

Nutritional information

- Turban snail, raw [1, 5]

Nutrition Facts

Serving Size 100 grams (100 grams)

Amount Per Serving

Calories	90	Calories from Fat	3.6
% Daily Value*			
Total Fat	0.4g	3%	
Saturated Fat	0g	3%	
Trans Fat			
Cholesterol	50mg	17%	
Sodium	70mg	3%	
Total Carbohydrate	2g	1%	
Dietary Fiber	0g	0%	
Sugars	0g		
Protein	19g		
Vitamin A	14%	• Vitamin C	3 %
Calcium	10%	• Iron	23 %

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

©www.NutritionData.com

Toxicity report

- There are no known contaminants

Seasonal availability

- Available year-round in San Diego

References

- [1] CalorieSlism. 2015. "Turban Shell (Sazae)". <http://slism.com/calorie/110295/#foodDataDetail>
- [2] Dong, Michael. "How To: Wavy Top 'Turban' Snails." Spearboard.com. Available: <http://www.spearboard.com/showthread.php?t=99314>
- [3] "Grilled Sea Snails: Sazae no Tsubuyaki." Oh My Omiyage, blog. Available: <https://ohmyomiyage.wordpress.com/2012/10/04/grilled-sea-snails-sazae-no-tsubuyaki/>
- [4] Monterey Abalone Company. "Abalone Recipes." Available: http://montereyabalone.com/recipes2.htm#Saut%20ed_Abalone
- [5] SELF nutrition data. 2013. "Mollusks, snail, raw". <http://nutritiondata.self.com/facts/finfish-and-shellfish-products/7742/2>
- [6] Taniguchi, Ian, and Laura Rogers-Bennet, California Department of Fish and Game. 2001. California's Living Marine Resources: A Status Report, pgs. 140-41. Available: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=34371>

Did you know?

Archaeological evidence suggests that native peoples fished wavy turban snail prior to European and Asian settlement in California! [6]

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CULINARY INFO SHEET

Megastaea undosa

STEP 1: CLEAN

Tools:

- Hammer, or similar tool
- Fillet knife



Method [1]:

1. EXPOSE the foot by hitting the shell with a hammer where the finger is pointing.
2. ROUTE a fillet knife around the shell opening to cut loose the foot and body.
3. CUT off the operculum.
4. TRIM the black part off the foot and cut it in half down the mid-line.
5. CUT OUT the esophagus and scrape the gut.
*the red and black parts.
6. RINSE the pieces and freeze for a couple days to tenderize, or use a meat mallet to tenderize the meat before cooking.

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STEP 2: PREPARE

TIP: Flatten the meat by whacking it several times with a tenderizer or mallet.

Entrée | Sautéed Turban Snail

Adapted from Monterey Bay Abalone Company [2]

Ingredients (serves 3-4):

- 500 g (about a pound) turban snail meat
- 1 egg, slightly beaten
- 2 teaspoons milk
- 3/4 c. sifted seasoned dry breadcrumbs
- 2 tablespoons vegetable oil



Photo credit: https://arrowsroots.files.wordpress.com/2012/06/img_5607.jpg

Method:

1. Cut the snail into 1 cm thick steaks, and pound to tenderize.
2. Mix the egg and milk and beat slightly; place the mixture in a shallow plate. In a second plate, place the breadcrumbs.
3. Dip the snail in the egg wash, and then coat in the breadcrumbs.
4. When the oil is hot, sauté the snail steaks for about 1.5-2 minutes on each side.

SERVING SUGGESTIONS:

Wavy turban snail is best served grilled, sautéed, battered and fried, in stir fries, in pastas, or in soups and chowders

OTHER RECIPE IDEAS:

Due to the likeness in texture and taste between abalone and the wavy turban snail, many abalone recipes can be adapted to turban snail cooking.

Compiled by: A. Van, N. Venuti, & T.S. Talley, California Sea Grant

Entrée | Turban Snail Chowder

Adapted from Monterey Bay Abalone Company [2]

Ingredients (serves 4):

- 500 g (about a pound) turban snail meat, chopped very finely
- 1/4 c. butter mixed with 2 tbsp. oil
- 1/2 c. each of chopped leek, onion, and green pepper
- 1/4 c. celery, chopped
- 1/2 pint fish stock
- 2 c. diced potatoes
- Salt and pepper to taste
- 1/4 c. butter
- 1/2 c. flour
- Pinch each of nutmeg and cayenne pepper
- 1 c. each of milk and cream
- 1/4 sherry



Photo credit: <https://hungryforwar.files.wordpress.com/2011/06/newenglandclamchowder12.jpg>

Method:

1. Heat the oil and butter mixture in a large saucepan. When hot, add all of the vegetables and sauté until lightly brown. Add the chopped snail and the fish stock, and bring to a boil. Add the potatoes and let chowder simmer while preparing the cream sauce.
2. In a separate saucepan, melt 1/4 cup butter. Add the flour and blend it in thoroughly. Add salt to taste, nutmeg, and cayenne pepper. Let simmer for 2 minutes. Mix the cream and milk together, add to the flour mixture and heat gently, stirring constantly. When smooth, add sherry.
3. Add cream sauce to simmering chowder. Bring to a quick boil, stirring well. Serve with chunks of French bread.



References

[1] Dong, Michael. "How To: Wavy Top 'Turban' Snails." Spearboard.com. Available: <http://www.spearboard.com/showthread.php?i=99314>

[2] Monterey Abalone Company. "Abalone Recipes." Available: http://montereyabalone.com/recipes2.htm#Saut%20Ed_Abalone