

# Mediterranean mussel

## BIOLOGY FACT SHEET

*Mytilus galloprovincialis*



Photo: wtseafood.com

## San Diego seafood profiles

### Taxonomic description

- Also known as the black mussel because the shell can be dark blue or brown to an almost black color, relatively smooth.
- Two shells are equal, each with a rounded and a slightly bent edge
- Can grow up to 15 cm (6") but is typically found to grow between 5-8 cm (2-3") [3].

### Distribution

- Native to the Mediterranean coastline, but found around the world due to unintentional transport of the larvae and adults in ballast water and hull fouling communities of ships traveling overseas for shipping and trade; and intentional introductions for aquaculture [3].

### Life history

- Fast growing with high reproductive output
- Can attain 7 cm within its first year at favorable sites [3]
- Can reproduce multiple times per year and reach sexual maturity in 1-2 years
- Reproduces through broadcast spawning, or releasing gametes into the water column [1]
- Fertilized eggs develop into free-swimming larvae, which then attach to rocks.

### Habitat

- Found mostly on temperate sheltered and exposed rocky shores; attaches to rocks using byssal threads.
- Extremely tolerant to environmental changes [3].

- Mostly found in the intertidal zone where there are intermediate levels of wave exposure. [3]
- Able to hybridize with sister taxa, including *M. trossulus* (bay mussel) which is native in California.
- Feeds by filtering particles through gills
- Main predators include sea stars & gulls.

### References

- [1] Van Erkom Schurink, C. & Griffiths, C.L. 1991. A comparison of reproductive cycles and reproductive output in four southern African mussel species. *Marine Ecology Progress Series* 76: 123-134.
- [2] "Mediterranean Mussel *Mytilus Galloprovincialis*." Department of Agriculture, Forestry and Fisheries. Department of Agriculture, Forestry and Fisheries. Web.
- [3] GISD. 2012. Global Invasive Species Database - *Mytilus galloprovincialis* - Available from <http://www.issg.org/database/species/ecology.asp?si=102&fr=1&sts=sss&lang=EN>
- [4] <http://www.sciencedaily.com/releases/2013/07/130723113657.htm>

### Did you know?

Nature's bungee cords! Byssus threads, which mussels use to attach themselves to rocks, are stretchy but also strong so are being explored for uses such as body armor, architectural engineering, and surgical sutures [4].



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## FISHERY FACT SHEET



Shellfish being harvested at Carlsbad Aquafarm.  
Photo: Carlsbad Aquafarm.

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### Seasonal availability

- Available year-round

### Managing authority

- Growing methods & product are regulated by federal, state & local agencies: Army Corps of Engineers (lead), NOAA, U.S. Fish & Wildlife Service, U.S. Dept of Agriculture, Food & Drug Administration, California Dept. of Public Health Services, California Dept. of Fish and Wildlife, County Dept of Public Health) [i].
- Pacific Coast Shellfish Growers Association is an industry-based organization that includes & represents growers along the U.S. Pacific coast in establishing science-based farming practices, & ensuring environmental protection, shellfish safety, & support with regulatory, technology & marketing updates.

### Gear type

- Grown off bottom in the water column on vertical lines of rope supported by buoys. When it is time to harvest, ropes are lifted

using booms over a boat deck and the mussel is collected. [ii]  
• No fertilizers, chemicals or antibiotics added- food is naturally occurring phytoplankton.

### Status of the fishery

- Most U.S. farms collect mussel larvae from wild populations and transfer them to the farm for grow-out to adults [v]. This has little effect on wild populations due to the mussel's high reproductive rates.
- Recent technology has allowed culturing of larvae on the farm [i]

### Potential ecosystem impacts

- Aquaculture reduces the pressure on local natural populations and limits the need for imported seafood.
- The presence of mussel and racks create habitat for marine plants and animals, and improve water quality by the mussel filtering algae and particulates. Some benthic disturbance results from shading and organic accumulations beneath racks [i].

- Introduced species that is tolerant of a wide-range of conditions allowing it to thrive in local coastal ecosystems if released as larvae or adults [i, iii].
- Considered "naturalized" & hybridizes with the native blue mussel, *M. trossulus* [iv].

### References

- [i] FishWatch. 2013. Blue mussel. NOAA FishWatch U.S. Seafood Facts. [http://www.fishwatch.gov/seafood\\_profiles/species/mussels/species\\_pages/blue\\_mussel\\_farmed.htm](http://www.fishwatch.gov/seafood_profiles/species/mussels/species_pages/blue_mussel_farmed.htm)
- [ii] Carlsbad Aquafarm. Prod. Brian Robles and Cindy Kendrick. Green-Scene, 2013. YouTube.
- [iii] Lockwood, B.L., G.N. Somero. 2011. Invasive and Native Blue Mussels (genus *Mytilus*) on the California Coast: The Role of Physiology in a Biological Invasion. *Journal of Experimental Marine Biology and Ecology* 400: 167-174.
- [iv] Shinen JS, Morgan SG. 2009. Mechanisms of invasion resistance: competition among intertidal mussels promotes establishment of invasive species and displacement of native species. *Mar Ecol Prog Ser* 383: 187-197.
- [v] European Commission. 2013. Fisheries. [http://ec.europa.eu/fisheries/marine\\_species/farmed\\_fish\\_and\\_shellfish/mussels/index\\_en.htm](http://ec.europa.eu/fisheries/marine_species/farmed_fish_and_shellfish/mussels/index_en.htm)

### Did you know?

The first recorded organized shellfish farm was a mussel farm in France in 1235 where they cultured mussels on wooden stakes [v].

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## NUTRITION FACT SHEET

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Mussels with garlic and ginger from [www.iFood.tv](http://www.iFood.tv)  
Photo: Powerplantop, flickr creative commons

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### Edible portions

- Entire contents of the shell

### Culinary uses

- Best fresh, but may be frozen
- Generally cooked whole, for example, steamed until the shell opens.
- Add mussel to a pan containing favorite ingredients, such as olive oil, garlic, lemon, wine, and red peppers, over medium heat. Once open and cooked, it's ready to eat!
- Other recipes include: paella, seafood couscous, Mediterranean fettuccine, cioppino [4]

### Description of meat

- Much meatier than most other mussels
- Delicate flavor with a rich, buttery texture

### Seasonal availability

- Available farm fresh in San Diego year-round[2]

### Nutritional information

Cooked, moist heat (3 oz) [1]

Nutrition Facts	
Serving Size 85 g	
Amount Per Serving	
Calories 146	Calories from Fat 34
% Daily Value*	
Total Fat 4g	6%
Saturated Fat 1g	4%
Trans Fat	
Cholesterol 48mg	16%
Sodium 314mg	13%
Total Carbohydrate 6g	2%
Dietary Fiber 0g	0%
Sugars	
Protein 20g	
Vitamin A 5%	Vitamin C 19%
Calcium 3%	Iron 32%
*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.	
NutritionData.com	

### Toxicity report

- Farmed mussels are controlled and monitored for safety with no reported contaminants.

- Collecting mussel from local bays is not recommended; biotoxin levels are often unmonitored and depend on quickly fluctuating water quality and algal blooms of the bay. Many of these toxins cannot be cleared with freezing or cooking [3]

### References

- [1] SELF Nutrition Data. 2013. Mollusks, mussel, blue, cooked, moist heat. <<http://nutritiondata.self.com/facts/finfish-and-shellfish-products/4187/2>>
- [2] Richards, John B., and George A. Trevelyan. "Culture of Mussels." Trans. California's Living Marine Resources: A Status Report. California Department of Fish and Game, 2001. Web. 10 Aug. 2013. <<http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=34257>>.
- [3] "Mediterranean Mussels." FishChoice.com. FishChoice Inc., n.d. Web. 10 Aug 2013. [www.fishchoice.com/buying-guide/mediterranean-mussels](http://www.fishchoice.com/buying-guide/mediterranean-mussels).
- [4] This is a great source for all types of recipes. "Mediterranean Mussel Recipes." Yummly. [www.yummly.com/recipes/mediterranean-mussels](http://www.yummly.com/recipes/mediterranean-mussels)
- [5] [www.wildcoast.co.za/facts-about-mussels](http://www.wildcoast.co.za/facts-about-mussels)

### Did you know?

Pale white mussel meat indicates a male, and a warmer, more orangey color indicates a female [5].

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## CULINARY INFO SHEET

### STEP 1: CLEAN

#### Tools:

- Bowl
- Cold Water
- Towel
- Slotted Spoon
- Toothbrush

#### Method [1]:

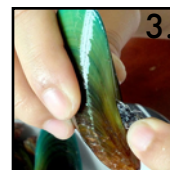


Photo Credit: wikiHow.com  
Note: Species pictured is "green mussel"

1. **SORT** Discard of any broken or dead mussels (those with open shells that do not close after being lightly tapped on the counter).
2. **CLEAN** Right before cooking, soak mussels in a bowl of cold water for 20 minutes so they can expel any sediment.
3. **DEBEARD** Locate the beard (little brown threads), and pull towards the hinge-end of the mussel. Use a towel to gain a better grip.
4. **DRAIN** Use a slotted spoon to transfer the mussels to a fresh bowl of cold water.
5. **BRUSH** Use a toothbrush to scrub off any growth clinging to the shell and then rinse under running water.
6. **DRY** Pat mussels dry before cooking.

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### STEP 2: PREPARE

#### Appetizer | French Steamed Mussels

Adapted from Julia Child's "Mastering the Art of French Cooking" [2]

#### Ingredients (serves 4-6):

- 1/4 c. all-purpose flour
- 3 lbs. mussels, cleaned
- 1 c. dry white wine\*
- \*Non-alcoholic substitution: 1/2 c. vinegar + 1 tbsp. sugar + 1/2 c. water
- 1/4 c. minced scallions, shallots, or leeks
- 4 parsley sprigs + 1/4 c. parsley, chopped
- 1/2 of a bay leaf
- 1/2 tsp. fresh thyme, chopped
- 1/8 tsp. black pepper
- 3 tbsp. unsalted butter
- 1 baguette, in 1/2-inch slices, drizzled with olive oil & toasted



Photo Credit: yumsugar.com

#### Method:

1. In a bowl, mix together flour and 4 c. of water. Submerge the cleaned mussels into the mixture, adding additional water as needed to cover the mussels. Allow the mussels to soak at least 30 minutes.
2. Combine wine, onion, parsley sprigs, bay leaf, thyme, pepper, and butter in a stockpot. Bring to a simmer over high heat.
3. Drain the mussels from the mixture and rinse with fresh water.
4. Add mussels to stockpot and cook for 5 mins. Shake the pot frequently for even cooking.
5. Serve in a bowl with cooking broth, parsley and a side of toasted baguette.

#### Entrée | Spicy Tomato Sauce Mussels over Linguini

Adapted from montereybayaquarium.com [3]

#### Ingredients (serves 4): Method:

- 4 tbsp. olive oil
  - 1/2 red onion, chopped
  - 2 garlic cloves, sliced
  - 1/2 tsp. red pepper flakes
  - 1 28-oz can Italian tomatoes in puree
  - 1 c. dry white wine\*
  - \*Non-alcoholic substitution: 1/2 c. vinegar + 1 tbsp. sugar + 1/2 c. water
  - 1 1/2 tbsp. fresh thyme, minced
  - 1 tbsp. tomato paste
  - Pinch salt + black pepper
  - 1 lb. linguini
  - 1/4 c. drained capers
  - 2 lbs. mussels, cleaned
  - 1/4 c. chopped Italian parsley
1. In a pot, heat 2 tbsp. oil over medium heat. Add onion, garlic, and pepper flakes. Sauté for 5 minutes, or until golden in color.
  2. Add tomatoes, 1/2 c. wine, thyme, and tomato paste. Bring to a boil, then reduce heat and simmer until thick, about 15 minutes. Stir often, breaking up tomatoes. Season with salt and pepper, to taste.
  3. Cook pasta in salted water for 10 mins, until tender but firm.
  4. Add remaining wine and all the capers to the sauce and boil.
  5. Place mussels in broth and cook 4 mins, or until mussels open.
  6. Drain pasta and place in sauce.
  7. Add remaining oil and stir over high heat for 1 min.
  8. Serve with sprinkle of parsley.

Photo Credit:  
Monterey  
Bay  
Aquarium



#### SERVING SUGGESTIONS:

Mussels are best eaten steamed, baked, or grilled.

#### OTHER RECIPE IDEAS:

Curried mussels; stuffed mussels; paella; mussels in saffron cream.

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#### References

- [1] wikiHow. Available: [www.wikihow.com/Clean-Mussels](http://www.wikihow.com/Clean-Mussels)  
[2] Childs, Julia. "Mastering the Art of French Cooking". PopSugar. Available: [www.yumsugar.com/Julia-Child-Steamed-Mussels-Recipe-24274999](http://www.yumsugar.com/Julia-Child-Steamed-Mussels-Recipe-24274999)  
[3] Kidd, Kristine. Monterey Bay Aquarium. Available: [http://www.montereybayaquarium.org/cr/cr\\_seafoodwatch/recipes/mussels\\_linguini.aspx](http://www.montereybayaquarium.org/cr/cr_seafoodwatch/recipes/mussels_linguini.aspx)