

Physical Characteristics of Black Spot and Wasting Disease in Urchins

Wasting Disease



Black Spot



This guide's purpose is to aid in identification of two types of disease symptoms commonly observed in urchins: wasting disease and black spot. The causative agents behind these characteristics are unknown, but presumed to be different diseases causing these symptoms.

Editors note: Most of the observational information garnered for this guide came from the Multi-Agency Rocky Intertidal Network and NPS Subtidal Kelp Forest Monitoring program. We thank the many others who contributed photos.

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- **Wasting Disease: Pages 3-4**

- Overall shortening of spines.
- Some wasted urchins have been observed recovering and appearing healthy again, but it is difficult to tell if an urchin is recovering or declining in health.
- Has been observed in Channel Island National Park since the 1990's.



- **Black Spot: Pages 5-6**

- Spineless lesions showing test bordered by a black ring.
- Has been commonly observed in Channel island National Park since ~2002.



- **Urchins with Wasting and Black Spot: Pages 7-8**

- Urchins can display symptoms of both wasting disease and black spot disease concurrently.
- It is thought that they are separate diseases as urchins are often seen with one disease morphology and not the other, and do not seem to progress from one type to the other.



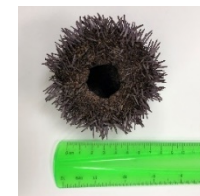
- **Dead tests with Black Spot: Page 9-10**

- Black ring lesions can be seen on dead empty tests. Sometimes these tests have holes.
- The presence of black spots on an empty test indicates disease may have played a role in the animal's death.



- **Dead tests with evidence of predation: Pages 11-12**

- Predation methods vary by species: Lobsters, Sheephead, and Sunflower stars.
- Empty tests can have holes from either predation or being washed around after the animal is deceased.



Stronglyocentrotus purpuratus unless noted

Wasting Disease - Shortened spines/generally uniform loss of spines. Sometimes shortening of spines is not uniform; see bottom two photos.

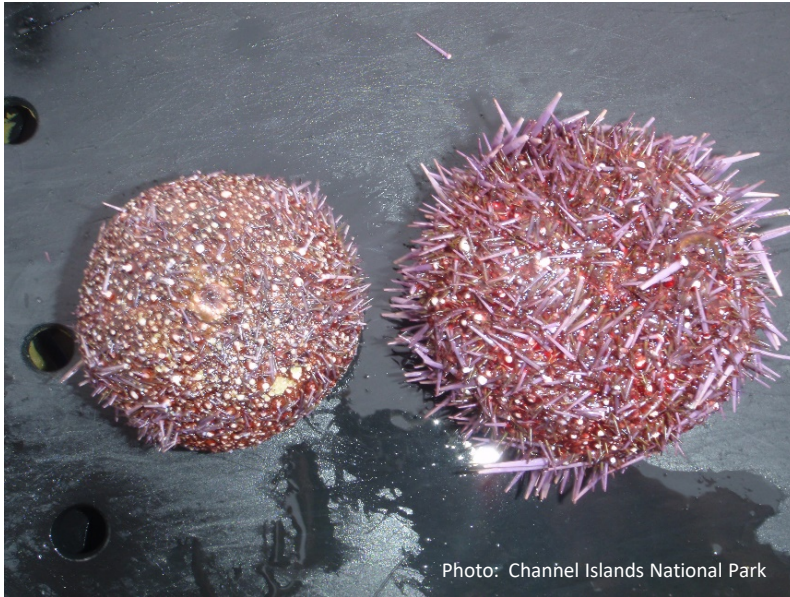


Photo: Channel Islands National Park



Photo: Channel Islands National Park
Kelp Forest Monitoring Program

S. franciscanus

Photo: Channel Islands National Park
Kelp Forest Monitoring Program



S. franciscanus

Photo: Channel Islands National Park
Kelp Forest Monitoring Program



Wasting Disease - Shortened spines/generally uniform loss of spines. Sometimes shortening of spines is not uniform; see bottom two photos.



S. franciscanus

Photo: Nichols

Hornby Island, BC



S. droebachiensis

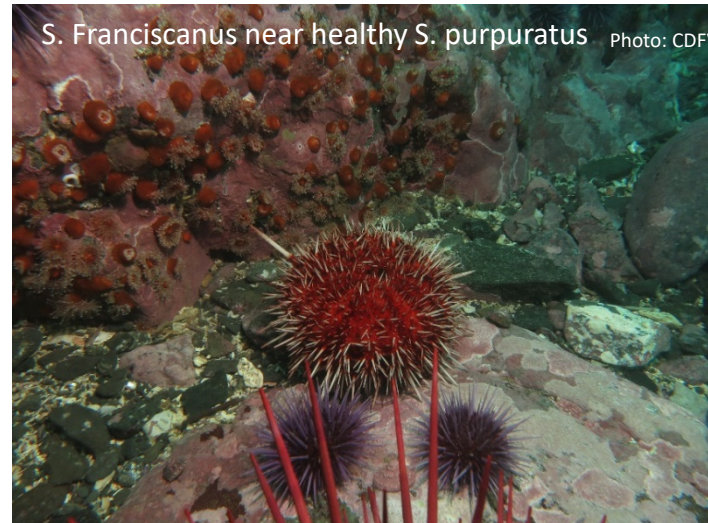
Photo: Nichols

Hornby Island, BC



S. franciscanus

Photo: Lafferty



S. franciscanus near healthy *S. purpuratus*

Photo: CDF

Mendocino County, CA

Black spot disease symptoms - Appearance of fairly characteristic lesions that can cause localized spines loss, test stains, and holes through the test. Also note that some dislodged urchins that are tossed around (striking rocks) can have abraded patches of spine loss, but these are not lesions (from Engle)



Photo: Smith

Orange County, CA



Orange County, CA



Black spot disease symptoms – More examples

Photo: Richards



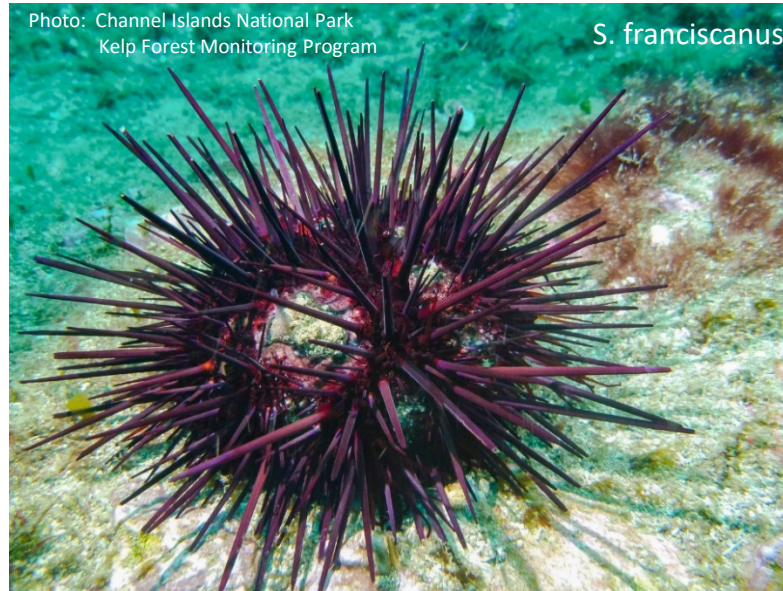
Photo: Channel Islands National Park
Kelp Forest Monitoring Program



Channel Islands National Park, CA

Photo: Channel Islands National Park
Kelp Forest Monitoring Program

S. franciscanus



Urchins can exhibit both wasting disease and black spot symptoms at the same time

Photo: Channel Islands National Park
Kelp Forest Monitoring Program

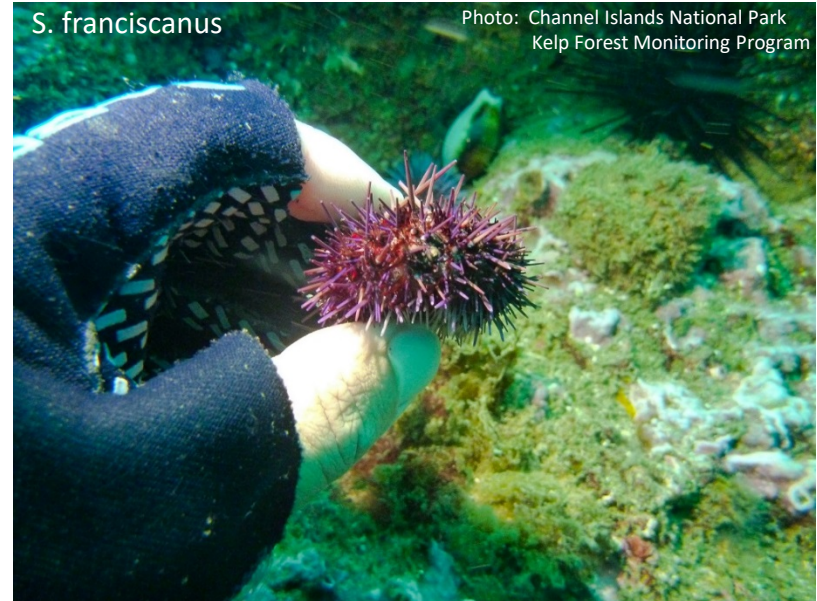


S. franciscanus

Channel Islands National Park, CA

S. franciscanus

Photo: Channel Islands National Park
Kelp Forest Monitoring Program



Channel Islands National Park, CA

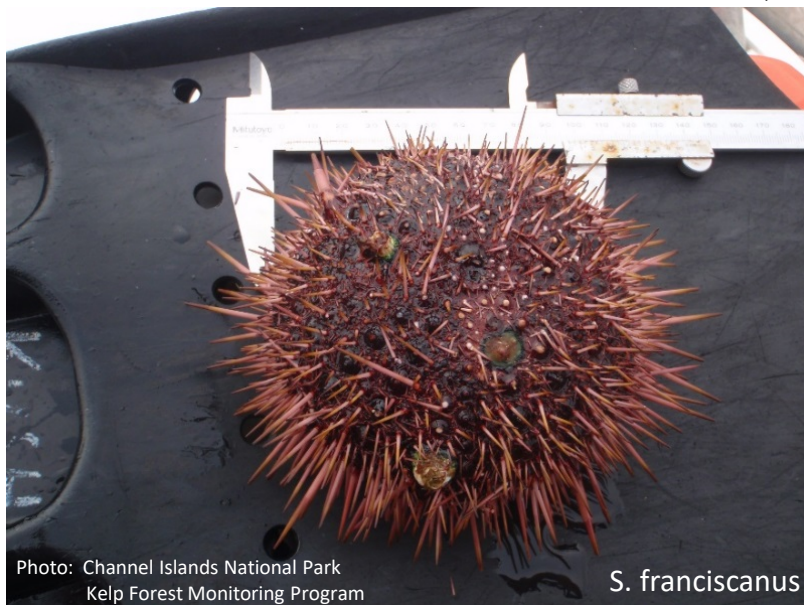


Photo: Channel Islands National Park
Kelp Forest Monitoring Program

S. franciscanus

Channel Islands National Park, CA



Photo: Caselle

Urchins can exhibit both wasting disease and black spot symptoms at the same time



Photo: Smith

Orange County, CA



Photo: Smith

Orange County, CA



Photo: Cuesta

Todos Santos, MEX



Photo: Caselle



Photo: Cuesta

Todos Santos, MEX

Empty Tests with black spot symptoms: purple urchins - empty tests often have holes due to predation or washing around in waves, but black spot diseased tests often have black ring or stain around the holes.



Photo: Smith

Orange County, CA



Photo: Smith

Orange County, CA



Photo: Behrens



Photo: Wisniewski

Empty Tests with black spot symptoms: Red urchins - empty tests often have holes due to predation or washing around in waves, but black spot diseased tests often have black ring or stain around the holes.

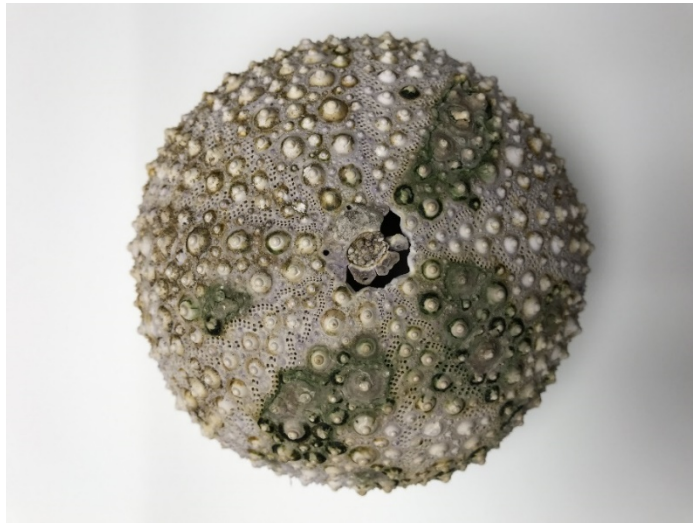


Photo credit and location for all on this page: Channel Islands National Park, CA

Whole urchin tests with no indication of cause of mortality - White, purple and red urchins (left to right, ventral and dorsal). Clean whole urchin tests could be 1) natural mortality, 2) Sunflower star or lobster predation, 3) wasting disease, or other causes.

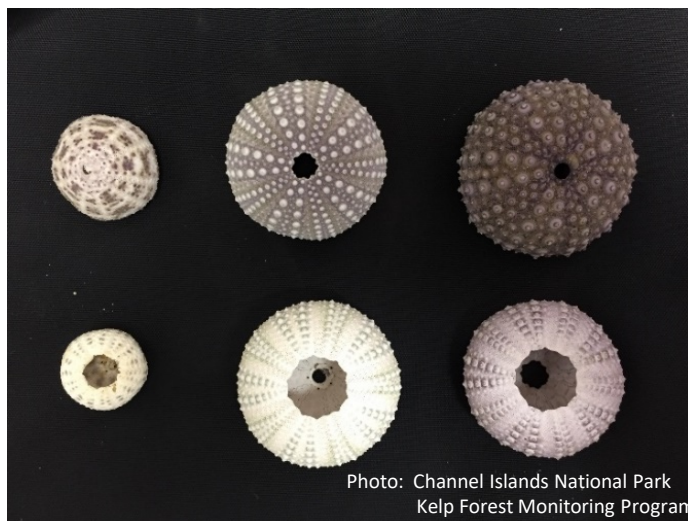


Photo: Channel Islands National Park
Kelp Forest Monitoring Program

Lobster predation - Lobsters tend to prefer purple urchins due to shorter spine lengths than red urchins, but do also eat red urchins. Small urchins (<30 mm TD) are generally consumed completely. Predation methods on larger urchins include (1) fracturing of test into pieces, (2) removing spines, removing the peristomial membrane and enlarging the oral opening in the test (see photos by Salomon below), and (3) removing the peristomial membrane, spines and test remain intact (see photos by Burnham below). (Tegner and Levin 1983).



Photo: Burnham

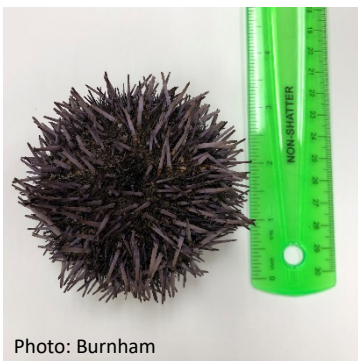


Photo: Burnham



Photo: Salomon

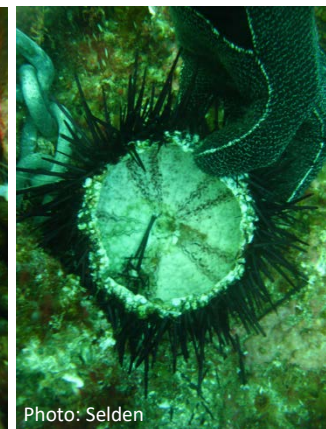
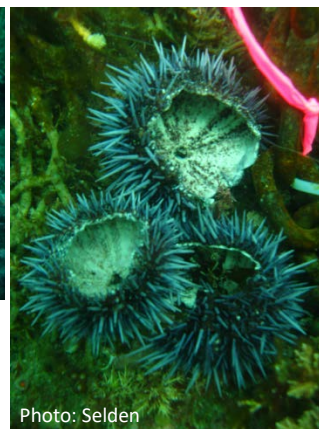


Photo: Salomon

Sunflower star predation: Predation by sunflower stars often leaves behind tests that are intact. Therefore, clean whole urchin tests could be 1) natural mortality, 2) sunflower star predation, 3) wasting disease, or other causes.



Sheephead predation: Smaller urchins (< 65 mm TD) are often cracked in half. Bigger urchins (particularly reds) are often flipped over and bite marks are evident at/around the Aristotle's lantern. (Robert Dunn personal comm.)



Community Science:

- Anyone can contribute observations of healthy and/or diseased urchins. Go to [Seastarwasting.org](https://seastarwasting.org) to see a tracking map of sea star and urchin disease, and to submit observations! Please send photos of diseased urchins for verification.



Monitoring Groups:

- If your monitoring program is collecting size frequencies on urchins, keep track of which disease symptoms you see and the size of the urchin. One can estimate the prevalence of the disease from this information as a percentage.
- If your program is not collecting size frequency information, you could estimate the prevalence as a percentage or range of percentage and keep notes on disease symptoms observed.

