Miscellaneous Invertebrate Pests and Predators

I. Causative Agent and Disease

Marine invertebrates that are considered pests and predators do not necessarily cause disease. They may kill bivalve molluscs by directly feeding on them or use them as a substrate which inadvertently causes debilitating damage that may affect the health of the bivalve or its marketability. Besides the numerous biofouling organisms other known pests of bivalves in Alaska include three species of pea crabs found inhabiting the mantle cavities of several bivalves and the introduced non-indigenous boring sponge, *Cliona thoosina*, that uses the external shell of several bivalve molluscs as a substrate. Common invertebrate predators of bivalves in Alaska include starfish and various species of crabs, most notably of the genus *Cancer.* Although two snail species of oyster drill are present in the Pacific Northwest, there have been no confirmed reports that either has become established in Alaska through importation of Pacific oyster spat.

II. Host Species

Upper ranges of pea crabs in Alaska, depending on species, include Akutan, Prince William Sound and Prince of Wales Island and are most commonly found in the mantle cavities of mussels, horse clams and occasionally other bivalve species. Boring sponge was introduced into Prince William Sound and can occur on various substrates including the shells of several bivalve molluscs, most notably Pacific oysters. Various starfish species and numerous species of crabs are common marine fauna throughout Alaska and opportunistically feed on any available species of bivalve mollusc.

III. Clinical Signs

Physical presence of the pest or predator is obvious causal evidence but in their absence there are occasional clinical signs to indicate they have been there. Signs of pea crab infestation can include minor damage or atrophy of mantle and gill tissues. Boring sponges burrow into calcium carbonate by localized secretion of enzymes that etch bivalve shells causing many small holes and a porous appearance. The stomach of a starfish is everted between the valves of a mollusc to digest the soft tissues leaving the empty cleaned valves. Crab predation generally leaves a jagged to rounded hole in one of the empty valves of the eaten bivalve. Although drills have not been reported in Alaska, these snails bore through the shell leaving a small perfectly round hole with an indented margin from the scouring action of their rasping mouthpart, known as a radula.

IV. Transmission

Invertebrate pests and predators are normal fauna of the marine environment that reproduce in the water column. Adult crabs and starfish are mobile and able to seek out hosts or prey. Boring sponges are disseminated horizontally in ambient water by sexual reproduction producing planktonic larvae or asexually by formation of spore-like gemmules or fragmentation and/or budding from the main sponge body that drift and settle elsewhere.

V. Diagnosis

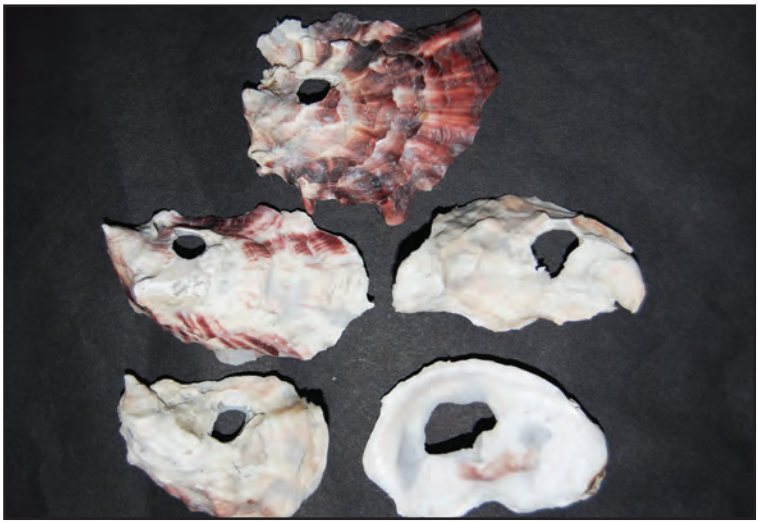
Diagnosis is based on observation of clinical signs or physical presence of the pest or predator.

VI. Prognosis for Host

Predators generally kill their prey. Pests may debilitate or weaken their hosts. Pea crabs are generally benign pests. Boring sponge can weaken the host shell that may increase vulnerability to predation or in the worse case dissolve the shell killing the host. Oysters with shells scarred by boring sponge generally are not marketable. There is always risk of introducing bivalve pests, predators and pathogens alike into new areas by the importation of shellfish such as Pacific oysters.

VII. Human Health Significance

There is no zoonotic human health concern with the presence of invertebrate predators or pests associated with bivalve molluscs except for the potential loss of aesthetic quality to the consumer.



Irregular to round holes in the shells of juvenile Pacific oysters produced by crab predation

Japanese oyster drill eggs on the shell of an adult Pacific oyster (Photo: R. Elston, AquaTechnics, WA)

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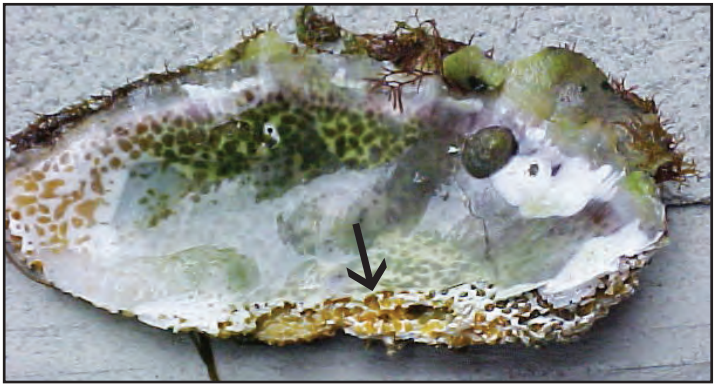
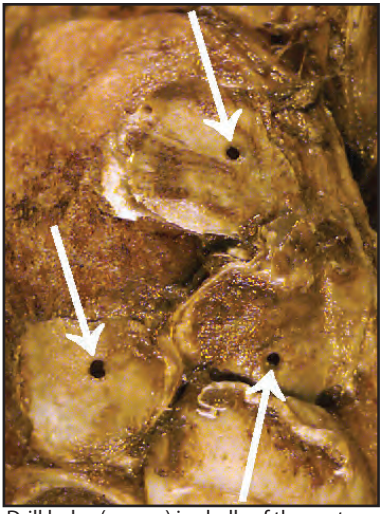
Boring sponge etching (arrow) on the external shell of a Pacific oyster (Photo: R. Elston, AquaTechnics, WA)



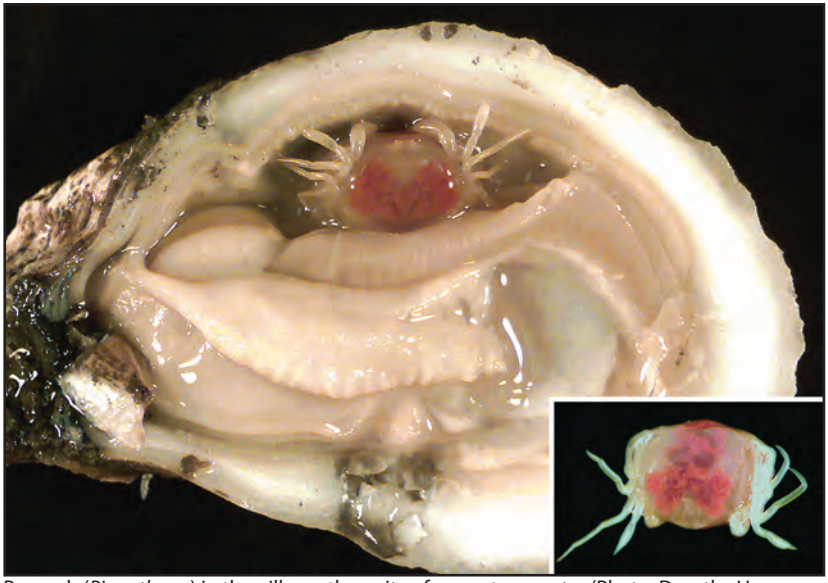
Boring sponge etching (arrow) that has penetrated to the internal shell surface of the same oyster (Photo: R. Elston, AquaTechnics, WA)

Starfish predation on bay scallop (Photo: Dorothy Howard, NOAA Cooperative Oxford, MD Laboratory)

Oyster drill *Urosalpinx cinerea* (Photo: Dorothy Howard, NOAA, Cooperative Oxford, MD Laboratory)



Drill holes (arrows) in shells of the eastern oyster (Photo: Dorothy Howard, NOAA Cooperative Oxford, MD Laboratory)



Pea crab (*Pinnotheres*) in the gill mantle cavity of an eastern oyster (Photo: Dorothy Howard, NOAA Cooperative Oxford, MD Laboratory)