

11. Ph. Arthropoda, Subph. Crustacea, Cl. Maxillopoda, Subcl. CIRRIPEDIA

"Oh, barnacles!" --SpongeBob

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| MAJOR TAXA | O. Thoracica (acorn & goose barnacles) |
| Ph. Arthropoda (>1,000,000 spp) | O. Acrothoracica (boring barnacles) |
| Subph. Crustacea (68,000) | O. Ascothoracica (parasites of cnidarians, echinoderms) |
| Cl. Maxillopoda (30,000) | |
| Subcl. Cirripedia (900) | O. Rhizocephala (parasites of crustaceans) |

Recap: Key innovations in the arthropod body plan (tanned cuticle, jointed appendages, tagmatization), challenges of movement and growth inside an exoskeleton

TOP TEN areas to explore and appreciate about barnacles and their relatives:

10. The cyprid: a shared, derived character (larval stage) for the subclass Cirripedia
9. The nauplius: a larval stage shared with copepods, ostracodes, and some decapods
8. Non-molting calcareous plates of thoracicans, the "true" barnacles
7. Capacity to bore into calcareous substrates by the plate-less acrothoracicans
6. Independent (?) evolution of parasitism in rhizocephalans and ascothoracicans
5. Independent (?) evolution of "dwarf" males in rhizocephalans and acrothoracicans
4. Thoracic limbs (cirri) specialized for filter feeding in two orders & phenotypic plasticity
3. Hermaphroditism and complementary males in thoracicans
2. Complete evolutionary loss (not fusion) of a tagma, the abdomen
1. Loss of motile cilia (sperm only) as a shared, derived character for all Arthropoda

GOALS

After studying from lecture notes and the associated reading, you should be able to:

- Describe phylogenetic relationships among the four major cirripede orders, and name a shared, derived characteristic of the group
- Explain how two orders gain nutrition through suspension feeding, but how they differ in plate production, reproduction, and the distribution of sexes among individuals
- Describe differences between the two major forms of thoracicans, name their major calcareous plates, and explain how the plates work and why they do not need to be molted
- Explain homologies in the body orientation and morphology of thoracicans as compared with other crustaceans, including changes in the presence and form of appendages and tagmata
- Explain the experimental results of Arsenault et al. regarding plastic changes in leg morphology to different feeding conditions, and compare these results with those of Palumbi, who studied phenotypic plasticity in sponge morphology—do similar tradeoffs exist?
- Describe the structure and function of appendages in the two cirripede larval forms, their role during larval development, and the process of metamorphosis that leads from a larval to an adult thoracican barnacle
- Describe the process of "infection" by rhizocephalans of their hosts and the role of the externa in insemination and reproduction
- Describe the highly derived morphology of an ascothoracid female, and explain why to the contrary the male morphology seems to reflect ancestral characteristics of crustaceans