

# Keystone snails: the biology, behaviour, ecology and conservation of patellid limpets

## References

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For the full article, see *British Wildlife* Volume 33, Number 3, December 2021.

The following list includes a selection of references providing additional information on the biology of limpets, grouped broadly by subject matter.

### General reading

If you would like to learn more about limpets, the following articles and books provide a very good starting point.

- Fretter, V., & Graham, A. 1994. *British Prosobranch Molluscs: Their Functional Anatomy and Ecology, 2nd Edition*. Ray Society Monographs Vol. 161. Ray Society, London.
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- Hawkins, S. J., Pack, K. E., Hyder, K., Benedetti-Cecchi, L., & Jenkins, S. R. 2020. Rocky shores as tractable test systems for experimental ecology. *Journal of the Marine Biological Association of the United Kingdom* 100: 1017–1041.
- Raffaelli, D. G., & Hawkins, S. J. 1996. *Intertidal Ecology*. Chapman and Hall, London.

### Distribution on British and Irish shores

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- Oróstica, M. H., Hawkins, S. J., Broitman, B. R., & Jenkins, S. R. 2020. Performance of a warm-water limpet species towards its poleward range edge compared to a colder-water congener. *Marine Ecology Progress Series* 656: 207–225.
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### Life cycle

#### Breeding seasonality

- Orton, J. H., & Southward, A. J. 1961 Studies on the biology of limpets. IV. The breeding of *Patella depressa* Pennant on the North Cornish Coast. *Journal of the Marine Biological Association of the United Kingdom* 41: 653–662.
- Orton, J. H., Southward, A. J., & Dodd, J. M. 1956. Studies on the biology of limpets II. The breeding of *Patella vulgata* L. in Britain. *Journal of the Marine Biological Association of the United Kingdom* 35: 149–176.

#### Larval settlement and juvenile development

- Bowman, R. S. 1981. The morphology of *Patella* spp. juveniles in Britain, and some phylogenetic inferences. *Journal of the Marine Biological Association of the United Kingdom* 63(3): 647–666.
- Lewis, J. R., & Bowman, R. S. 1975. Local habitat-induced variations in the population dynamics of *Patella vulgata* L. *Journal of Experimental Marine Biology and Ecology* 17: 165–203.
- Ribeiro, P. A., Xavier, R., Santos, A. M., & Hawkins, S. J. 2009. Reproductive cycles of four species of *Patella* (Mollusca: Gastropoda) on the northern and central Portuguese Coast. *Journal of the Marine Biological Association of the United Kingdom* 89: 1215–1221.
- Seabra, M. I., Cruz, T., Fernandes, J. N., Silva, T., & Hawkins, S. J. 2019. Recruitment of the limpet *Patella ulysiponensis* and its relationship with crustose coralline algae: patterns of juvenile distribution and larval settlement. *Journal of the Marine Biological Association of the United Kingdom* 99: 1787–1796.

#### Sex change

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### Biology

#### Competition between species

- Firth, L. B., & Crowe, T. P. 2010. Competition, habitat-suitability and the coexistence of key species on temperate rocky shores. *Oecologia* 162: 163–174.

#### Foraging activity

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- Santini, G., Thompson, R. C., Tendi, C., Hawkins S. J., Hartnoll, R. G., & Chelazzi, G. 2004. Intra-specific variability in the temporal organisation of foraging activity in the limpet *Patella vulgata*. *Marine Biology* 144: 1165–1172.

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### Limpet tenacity

Grenon, J. F., & Walker, G. 1981. The tenacity of the limpet, *Patella vulgata* L.: an experimental approach. *Journal of Experimental Marine Biology and Ecology* 54: 277–308.

## Interactions with other species

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### Influence of grazing

Jenkins, S. R., Coleman, R. A., Hawkins, S. J., Burrows, M. T., & Hartnoll, R. G. 2005. Regional scale differences in determinism of grazing effects in the rocky intertidal. *Marine Ecology Progress Series* 287: 77–86.

### Predators

Silva, A. C. F., Hawkins, S. J., Boaventura, D. M., Brewster, E., & Thompson, R. C. 2010. The use of the intertidal zone by mobile predators: the influence of wave exposure, tidal phase and elevation on abundance and diet. *Marine Ecology Progress Series* 406: 197–210.

### Wrack–limpet–barnacle dynamics

Burrows, M. T., & Hawkins, S. J. 1998. Modelling patch dynamics on rocky shores using deterministic cellular automata. *Marine Ecology Progress Series* 167: 1–13.

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## Conservation and environmental impacts

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### Effects of climate change

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Kendall, M. A., Burrows, M. T., Southward, A. J., & Hawkins, S. J. 2004. Predicting the effects of marine climate change on the invertebrate prey of the birds of rocky shores. *Ibis* 146: 40–47.

Southward, A. J., Hawkins, S. J., & Burrows, M. T. 1995. Seventy years' observations of changes in distribution and abundance of zooplankton and intertidal organisms in the western English Channel in relation to rising sea temperature. *Journal of Thermal Biology* 20(1–2): 127–155.

### Impacts of exploitation

Martins, G. M., Borges, C. D. G., Vale, M., Ribeiro, P. A., Ferraz, R. R., Martins, H. R., Santos, R. S., & Hawkins, S. J. 2017. Exploitation promotes earlier sex change in a protandrous patellid limpet, *Patella aspera* Röding, 1798. *Ecology and Evolution* 7: 3616–3622.

### Torrey Canyon oil spill

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Hawkins, S. J., et al. 2017. From the *Torrey Canyon* to today: a fifty year retrospective on recovery from the oil spill and interactions with climate change fluctuations on Cornish rocky shores. *International Oil Spill Conference Proceedings*, Long Beach California May 2017, pp. 74–104, Washington DC: American Petroleum Institute.