

## *Ralpharia coccinea* Stalked Hydroid species

### Taxonomy

*Ralpharia coccinea* Watson, 1984.

### Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* SAC 2004).

Categorised as Vulnerable in the 2009 Advisory list of threatened invertebrate fauna in Victoria (DSE 2009).

### Proposed conservation status

Critically Endangered in Australia

Criteria B1ab(ii,iii)+2ab(ii,iii)

### Species Information

#### Description and Life History

*R. coccinea* belongs to the class Hydrozoa, a very diverse group of Cnidarians containing approximately 3800 species (Schuchert, 2019b). Hydrozoans are typically solitary or colonial animals and are largely confined to saltwater and brackish environments. The majority of hydrozoan species have two separate stages in their life cycles, an asexual polypoid (attached) stage, wherein an individual may be solitary or form a colony consisting of other polyps specialised for different functions (i.e. feeding, reproduction, defence) and a sexual, free-swimming medusoid stage wherein an individual may move throughout the environment. Hydrozoa are amongst the most important planktonic and benthic predators, typically feeding on small crustaceans, fish eggs and larva and are often predated by fish, larger crustaceans and molluscs (Bouillon et al., 2006). Some species within the family Tubulariidae are preyed upon by sea slugs. However predation is not often fatal, as hydroids typically have the ability to regenerate tissue (Hughes, 1983).

The taxon can be distinguished from other members of its genus by its relatively small size and brightly coloured hydranths and gonophores. It is one of only six species within the family Tubulariidae to occur in temperate southern Australian oceans and its distribution may be largely dependent on the abundance of another Cnidarian species (Watson, 2008, 1984). There is an obligate association between it and the soft coral *Parerythropodium membranaceum*, wherein the hydrorhizas attach to the coral as the substrate (Watson 1984; Shepherd & Edgar, 2013; Cordeiro et al., 2019). Moreover, another closely related species, *R. magnifica*, is also found associated with both *R. coccinea* and the coralline substrate (Watson, 1984).

Interestingly, *R. coccinea* and its congener are two of only fifteen species of hydroids in the world that have been found to be associated with anthozoans (Hirose & Hirose, 2012). *R. coccinea* grows from the alcyonacean and may produce up to 200 hydranths. It has not been confirmed but it may be possible that the hydroid feed on the tissues of the coral, which it would be then considered a parasite rather than symbiont (Rohde, 2005).

While general traits are typically conserved in much of the class, Hydrozoans are incredibly varied in terms of their life cycle (Bouillon et al., 2006). All hydrozoans contain a planula larva stage which uses flagellum to move through the water until it encounters a firm and suitable substrate on which it may anchor itself before metamorphosis to the polypoid stage. The polyps may remain solitary or form colonies of polyps by asexual budding. The medusa form is produced from the polyp, swimming freely and producing eggs and sperm (Bouillon et al., 2006).



# *Ralpharia coccinea* Stalked Hydroid species

This taxon may only slightly depart from this generalised life cycle; however there is no specific data available on its reproductive biology, other than that it reproduces in late winter and throughout spring when the water temperatures are rising (Watson, 1984). Watson (1984) states that the early stages of development are very similar to its congener *R. magnifica* and likely follow the same growth sequence. Male and female medusae are likely released from the gonophores at night, releasing sperm and eggs into the water column wherein fertilisation occurs. The larva develop tentacles and drifts along the current until it comes into contact with the coralline substrate, where it quickly attaches itself and rapidly grows to produce a polyp and tentacles (Watson 1980; Shepherd & Edgar, 2013). One of the distinguishing characteristics of the genus is that the free swimming medusae lack a mouth. It is hypothesised that this may be an adaptive trait, as the delayed development of the oral tentacles and mouth until after the young hydranth is rooted to the specific coral may be a means of quickly establishing a secure attachment to the substratum in strong water currents (Watson, 1980).

## Generation Length

The generation length of *R. coccinea* is estimated to be 60 to 90 days, inferred from the congener *R. magnifica*.

## Distribution

The taxon is endemic to Victoria, and is only known to occur at Crawfish Rock, Western Port (Edmunds et al., 2009). It has not been recorded again since it was first collected in 1982. There have been a number of benthic marine surveys in Western Port, however this taxon has only been found in the one locality.

## Habitat

The taxon is known from one site in Western Port at 3 m depth. It is epizoic on the soft coral *Parerythropodium membranaceum* (Watson 1984; Watson, 2015).

## Threats

Threats encountered by this taxon are based on those listed in O'Hara (2002) as being specific to vulnerable marine habitats in which this species is found, namely embayments and the intertidal/subtidal shallow zone. Threats specific to the taxon have not been identified. Generic threats encountered by marine invertebrate species in Western Port may include the effects of eutrophication on water quality, dredging and catchment activities, fishing, biomass removal, marine pests, coastal development and climate change Edmunds et al. (2009).

### IUCN Criteria

Criterion A. Population size reduction. Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4			
	Critically Endangered	Endangered	Vulnerable
A1	≥ 90%	≥ 70%	≥ 50%
A2, A3, A4	≥ 80%	≥ 50%	≥ 30%

<p>A1 Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.</p> <p>A2 Population reduction observed, estimated, inferred or suspected in the past where the causes of the reduction may not have ceased OR may not be understood OR may not be reversible.</p> <p>A3 Population reduction, projected or suspected to be met in the future (up to a maximum of 100 years) [(a) cannot be used for A3]</p> <p>A4 An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a max. of 100 years in future), and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.</p>	<p>based on any of the following:</p>	<p>(a) direct observation [except A3]</p> <p>(b) an index of abundance appropriate to the taxon</p> <p>(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat</p> <p>(d) actual or potential levels of exploitation</p> <p>(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites</p>
--	---------------------------------------	---

### Evidence:

#### Ineligible under Criterion A

The population reduction does not meet the thresholds for eligibility under any of the criterion A2, A3 or A4.

There is no reliable information for past reductions because there have been no dedicated surveys for this taxon in the past 30 years. Future decline cannot be estimated since it is unclear when the identified threats are likely to result in a significant decline in population size or any other demographic parameter.

# Ralpharia coccinea

## Stalked Hydroid species

Criterion B. Geographic range in the form of either B1 (extent of occurrence) and/or B2 (area of occupancy)			
	Critically Endangered Very restricted	Endangered Restricted	Vulnerable Limited
B1. Extent of occurrence (EOO)	< 100 km <sup>2</sup>	< 5,000 km <sup>2</sup>	< 20,000 km <sup>2</sup>
B2. Area of occupancy (AOO)	< 10 km <sup>2</sup>	< 500 km <sup>2</sup>	< 2,000 km <sup>2</sup>
AND at least 2 of the following 3 conditions:			
(a) Severely fragmented OR Number of locations	= 1	≤ 5	≤ 10
(b) Continuing decline observed, estimated, inferred or projected in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals			
(c) Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals			

### Evidence:

#### Eligible under Criterion B1 as Critically Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 4 km<sup>2</sup>, based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA). The EoO has been made equal to the AoO to ensure consistency with the definition of AoO as an area within EoO.

It is inferred to have one location, because it occurs in a geographically or ecologically distinct area in which a single threatening event can rapidly affect all individuals of the taxon present.

It has a continuing decline in (ii) and (iii) above, due to the identified threats. There is a high likelihood that at least some individual occurrences at risk of local extinction.

#### Eligible under Criterion B2 as Critically Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 4 km<sup>2</sup>, based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, it has one location and a continuing decline in (ii) and (iii) above.

# Ralpharia coccinea

## Stalked Hydroid species

Criterion C. Small Population size and decline		Critically Endangered	Endangered	Vulnerable
Number of mature individuals		< 250	< 2,500	< 10,000
AND at least one of C1 or C2				
C1	An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future):	25% in 3 years or 1 generation (whichever is longer)	20% in 5 years or 2 generations (whichever is longer)	10% in 10 years or 3 generations (whichever is longer)
C2	An observed, estimated, projected or inferred continuing decline AND least 1 of the following 3 conditions:			
(a)	(i) Number of mature individuals in each subpopulation	≤ 50	≤ 250	≤ 1,000
	(ii) % of mature individuals in one subpopulation =	90 – 100%	95 – 100%	100%
(b)	Extreme fluctuations in the number of mature individuals			

### Evidence:

#### Ineligible under Criterion C

No recent surveys have specifically targeted this taxon, so there is no accurate way of estimating the past, current or future population size. The data for this taxon are over 30 years old.

Criterion D. Very small or restricted populations		Critically Endangered	Endangered	Vulnerable
Number of mature individuals (observed or estimated)		< 50	< 250	< 1,000
D2. Only applies to the VU category Restricted area of occupancy or number of locations with a plausible future threat that could drive the species to critically endangered or Extinct in a very short time.		-	-	D2. Typically: AoO < 20 km <sup>2</sup> or number of locations ≤ 5

### Evidence:


#### Eligible under Criterion D2 as Vulnerable

The taxon is inferred to be very restricted. It has a restricted distribution (i.e. AoO is 4) and has 1 location, such that this restriction makes the taxon capable of becoming CR or EX within one or two generations in response to the identified threats.

Criterion E (Quantitative Analysis) was not addressed as the taxon does not have a detailed Population Viability Analysis.

### References

Bouillon, J., Gravili, C., Pagès, F., Gili, J. Boero, F. (2006). An introduction to Hydrozoa. *Mémoires du Muséum national d'Histoire Naturelle*, 194: 1-591.



## *Ralpharia coccinea* Stalked Hydroid species

Cordeiro, R., van Ofwegen, L., & Williams, G. (2019). *World List of Octocorallia. Erythropodium hicksoni* (Utinomi, 1972). Accessed through: World Register of Marine Species at: <http://www.marinespecies.org/aphia.php?p=taxdetails&id=289921> on 2019-03-23

Davis, A., & White, G. (1994). Epibiosis in a guild of sessile subtidal invertebrates in south-eastern Australia: a quantitative survey. *Journal of Experimental Marine Biology and Ecology* 177, 1-14

DSE (2009) *Advisory list of threatened invertebrate fauna in Victoria - 2009*. Department of Sustainability and Environment, Melbourne.

Edmunds, M., Mustoe, S., Stewart, K., Sheedy, E. & Ong, J. (2009). *VNPA Nature Conservation Review: Marine conservation priorities and issues for Victoria*. Report to Victorian National Parks Association. Australian Marine Ecology Report 405, Melbourne.

Hirose, M., & Hirose, E. (2012). A new species of *Zanclaea* (Cnidaria: Hydrozoa) associated with scleractinian corals from Okinawa, Japan. *Journal of the Marine Biological Association of the United Kingdom* 92(05), 877-884. <https://doi.org/10.1017/S0025315411001238>

Hughes, R.G. (1983). The life-history of *Tubularia indivisa* (Hydozoa: Tubulariidae) with observations on the status of *T. ceratogyne*. *Journal of Marine Biology Association*, 63,467-479.

O'Hara, T.D. (2002). Endemism, rarity and vulnerability of marine species along a temperate coastline: Invertebrate Systematics. CSIRO Publishing: *Invertebrate Systematics* 16(4), 671-684.

Rohde, K. (2005). *Marine parasitology*. CSIRO Publishing, CAB International. 592 pp.

SAC (2004). Flora and Fauna Guarantee Scientific Advisory Committee: Final Recommendation on a Nomination for Listing. Nomination No. 720 *Ralpharia coccinea*.

Shepherd, S.& Edgar, G. (2013). *Ecology of Australian temperate reefs: The unique south*. CSIRO Publishing, pp 306.