

= Podoserpula =

Podoserpula is a genus of fungi in the family Amylocorticiaceae . The genus contains two species : the type , *P. pusio* , commonly known as the pagoda fungus , and the " Barbie pagoda " , *P. miranda* , officially published in 2013 . Podoserpula species produce fruit bodies consisting of up to a dozen caps arranged in overlapping shelves , attached to a central axis . Its unique shape is not known to exist in any other fungi . Four varieties of *P. pusio* are known , which differ in their sizes , spore morphology , and distribution . The genus is known to occur in Australia and New Zealand , Venezuela , Madagascar , and New Caledonia .

= Taxonomy and phylogeny =

Craterellus pusio was first described by Miles Joseph Berkeley in an 1859 publication by James Hooker . Otto Kuntze transferred it to the genus *Merulius* in 1891 . Until the 1960s , however , it was known as *Craterellus multiplex* , a species described by Mordecai Cubitt Cooke and George Edward Masee in 1889 , and moved to *Cantharellus* by Curtis Gates Lloyd in 1920 . In 1958 , British mycologist R.W.G. Dennis collected the species in Venezuela during an expedition financed by the Percy Sladen Memorial Trust . Derek Reid , attempting to identify the species , rediscovered Berkeley 's name , which had priority , and described the new genus *Podoserpula* for it in 1963 while simultaneously describing four varieties of it .

Reid considered the genus allied to *Leucogyrophana* , then thought to belong to the family Coniophoraceae . Marinus Anton Donk , in a monograph published the next year , agreed and placed it close to *Serpula* and *Coniophora* ; these genera are now known to represent early @-@ diverging lineages in the Boletales order . However , the white spore print and small , smooth , and hyaline spores are not characteristic of species in the Coniophoraceae . In a large @-@ scale phylogenetic analysis published in 2006 , *Podoserpula* nested far from them in the Plicaturopsis clade , an evolutionarily related group of early @-@ diverging members of the Agaricales order . Other taxa in this clade include *Plicaturopsis* and *Sclerotium rolfsii* . The entire clade was later separated into three smaller orders , *Podoserpula* becoming a member of the Amylocorticiales along with mostly corticioid genera such as *Amylocorticium* and *Serpulomyces* .

A new species , *Podoserpula miranda* , was proposed in 2009 by a group of New Caledonian mycologists for a species of that South Pacific archipelago . The name was provisional (not validly published) , however , as the description was in French (the code of nomenclature mandates Latin) and lacked a required designation of a type specimen . It was validly published in 2013 .

= Description =

The fruit bodies of *Podoserpula* species have an unusual form unknown in other fungi . The fruit bodies , which grow to a height of 1 ? 18 cm (0 @. @ 4 ? 7 @. @ 1 in) , consist of up to a dozen cup @-@ shaped (spathulate) to kidney @-@ shaped (reniform) caps arranged in multiple tiers and attached to a central stem . Caps are joined to the main axis by short , flattened , stem @-@ like attachments . The variety *tristis* , in contrast , has caps that are more circular and appear to be pierced either centrally or off to the side . The surface of the caps is smooth and often brightly colored . The hymenium (spore @-@ bearing surface) on the underside of the caps is pink and has a folded and corrugated surface . Close to the area of attachment between the cap and the stem @-@ like connection to the main axis are swellings resembling warts or blisters . Individual caps resemble somewhat those of the European species *Plicaturopsis crispa* .

Podoserpula has a monomitic hyphal structure , meaning that it only contains generative hyphae , which are relatively undifferentiated and can develop reproductive structures . These hyphae are thin @-@ walled , hyaline (translucent) , branched , and up to 10 ?m thick . They have distinct , often swollen , clamp connections at the septa . The spores are small , typically 2 @. @ 75 ? 6 by 2 ? 3 @. @ 5 ?m , smooth , hyaline , and vary in shape from roughly elliptical to somewhat spherical . The basidia (spore @-@ bearing cells) can be either two- or four @-@ spored , and are club

shaped , with a clamp connection at the base . *Podoserpula* has neither cystidia nor gloecystidia .

Podoserpula pusio var. *pusio* is the nominate variety . Its fruit bodies are rarely greater than 7 @. @ 5 cm (3 @. @ 0 in) tall . Variety *austro @-@ americana* is the largest of the varieties , reaching heights up to 18 cm (7 @. @ 1 in) . Other than its size and geographical distribution , it is roughly similar to var. *pusio* . Variety *ellipsospora* has elongated elliptical spores typically measuring 4 ? 5 by 2 @. @ 75 ? 3 @. @ 5 ?m . Variety *tristis* has caps whose upper surfaces are colored pale fawn , and the main axis of the fruit bodies pierces through the cap .

Podoserpula miranda grows to a height of 10 cm (3 @. @ 9 in) . It differs from *P. pusio* var. *pusio* in having thinner flesh , up to six funnel @-@ shaped caps whose size diminishes approaching the top , and a bright pink coloration in the folds of the hymenium .

= = Habitat and distribution = =

The fruit bodies of *Podoserpula pusio* grow on the ground , on well @-@ rotted stumps , or among decaying tussock grass . They are presumed to be saprobic , and obtain nutrients by breaking down larger organic molecules found in the soil or in decaying wood . *P. miranda* in contrast , is thought to be ectomycorrhizal , as it appears to associate with *Arillastrum gummiferum* , the predominant canopy tree in the forests where it is found .

The nominate variety is found in Australasia , but in 1997 it was reported in a protected area near Antananarivo in Madagascar , and in 2009 on the Falkland Islands . Variety *ellipsospora* occurs in Australia , var. *tristis* in New Zealand , and var. *austro @-@ americana* is known from Venezuela .