The Other Hosts of *Puccinia arenariae* Debbie Evans


Heavy infection of *Puccinia arenariae* on *Silene dioica*

The microcyclic rust *Puccinia arenariae* is most familiar to rust recorders as a common pathogen of *Silene dioica*, Red Campion and along with *Puccinia behenis*, the second rust infecting this host, it is currently being actively recorded in GB for Gill Brand's 'Red Campion Rust Survey'. The survey has now been extended to include records on *Silene latifolia*, White Campion, but *Puccinia arenariae* also infects a range of other plants in the Caryophyllaceae, the Pink Family, e.g. stitchworts, sandworts, pearlworts and chickweeds and this article will ain to describe the infection on some of these hosts. A few of the plants grow in hedgerows and in similar situations to the Campions and could easily be looked for and recorded at the same time.


Puccinia arenariae infection on *Dianthus barbatus* leaves showing the typical circinate arrangement of the telia
(Pressed samples courtesy of Tom Preece, TFP)

Puccinia arenariae is sometimes called the 'Sweet William Rust' because it can infect this garden plant, *Dianthus barbatus*. The first place to look for the rust on other hosts could therefore be on leaves in the garden. I personally have not recorded it on this host but Gill reports three records during this survey; two on cut flowers for sale (GB, TFP) and one from a garden centre, (TFP). The symptoms of the infection are very similar to those on Red Campion with pale green spots on the upper surface of leaves and brown telial pustules on the corresponding area on the underside. The telia typically form attractive circinate lesions on the leaves. There are 59 records in the FRDBI of which only 9 records are from the last 20 years. Is this an under-recorded pathogen-host relationship as gardeners are generally not rust enthusiasts and their primary aim is to get rid of any fungal problems rather than record them?
A further garden plant that has been found with *Puccinia arenariae* is cultivated *Gypsophila elegans.*

Pale, mottled leaves of infected *Stellaria holostea*

Puccinia arenariae infection on *Stellaria holostea*

The rust frequently infects *Stellaria holostea*, Greater Stitchwort and *Stellaria graminea* Lesser Stitchwort. These common hedgerow plants can be easily checked while looking at Campions especially in the autumn. Infection on *Stellaria holostea* is less obvious with leaves often looking 'scruffy' anyway at this time of the year and plants may require a closer inspection. Infected leaves are often paler or mottled on the upper surface with the dark-brown telia on the underside. The telia can be larger and darker-brown and don't show the typical circular arrangement as those on the Campion leaves.

Puccinia arenariae infection on *Stellaria holostea* leaves and stem

This difference in the appearance and arrangement of the telia between hosts is more likely to be due to a difference in the host tissues than to being separate forms of the rust and cross infection experiments have shown the rust to be the same on the different hosts (W&H). The telia are also found on the stems. Symptoms are similar on Lesser Stitchwort and as the leaves are more fleshy they often have larger telia present. These also occur on stems and petioles and the sometimes almost black telia rupture the host epidermis and finally burst open to reveal the dark-brown teliospores. Infections can sometimes be quite heavy but it is also possible with both hosts to find just a few infected leaves. I have been looking on the two plants this autumn and have found infection on both to be quite common in VCs 49 and 52.

Puccinia arenariae infection on *Stellaria graminea* leaves

Puccinia arenariae infection on *Stellaria graminea* leaves and stems

Infection on other members of the Caryophyllaceae tends in my experience to be less common and many records are chance findings. *Stellaria media*, Common Chickweed is an extremely widespread and frequent weed in gardens, verges, hedgerows, fields etc; probably one of our commonest weeds, but I only occasionally find infected plants, either single leaves or whole plant infections. Telia can be on leaves, petioles, sepals or stems and symptoms are very similar to those on *Stellaria graminea.*

Puccinia arenariae infection on *Stellaria media*

Others in this group *Stellaria uliginosa*, Bog Stitchwort, *and Moehringia trinervia*, Three-nerved Sandwort can be similarly infected and I have made occasional records on both these hosts. *Stellaria palustris*, Marsh Stitchwort and *Stellaria nemorum*, Wood Stitchwort both have few records in the database but I have not seen infected plants myself.

Puccinia arenariae infection on *Stellaria uliginosa*

Melampsorella caryophyllacearum infection on *Stellaria graminea* leaves

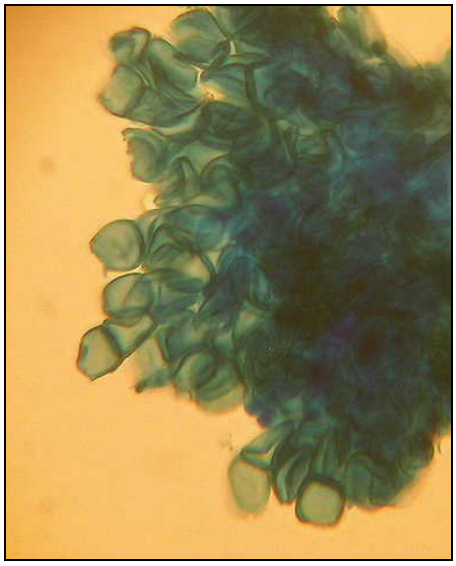
On *Stellaria graminea* in particular I often also find the tiny yellow uredinia of the heterocyclic rust *Melamsorella caryophyllacearum* on the underside of the leaves and on stems. There is little evidence of the infection on the upper leaf surfaces apart from a slight paling, so it has to be checked for by examining the undersides of leaves. The sori are small and can be seen with the naked eye but a hand lens is useful. Once I became aware of the presence of this rust species and started looking for it, I found it to be fairly common and widespread locally yet it must be another under-recorded species. I have recorded this rust and *Puccinia arenariae* on the same Lesser Stitchwort plant both on separate leaves and together on the same leaf. *M. caryophyllacearum* does occasionally occur on other *Stellaria* and *Cerastium* species, Mouse-ears. I have been unable so far to find an infected *Cerastium* and only a few infected *S. holostea* and *S. uliginosa* plants and a single record on *S. media* suggesting that infection is less common on these hosts in my area.

Leaf of *Stellaria graminea* showing the brown telia of *Puccinia arenariae* and the yellow uredinia of *Melampsorella caryophyllacearum*

Puccinia arenariae can infect species of *Sagina* especially *Sagina procumbens*, Procumbent Pearlwort. This is a tiny host and there is probably no substitute to getting down on your knees with a hand lens to closely examine the plants. They usually show a slight yellowing but otherwise infection may not be obvious from a distance because of the plant size. I have been known to crawl across my patio inspecting the *Sagina* growing between the paving slabs! Telial sori may be as big as the leaves and also occur on the stems and buds. This is probably another fairly common host if time is available to look for the rust

Puccinia arenariae infection on *Sagina procumbens*

A single telium of *Puccinia arenariae* on a *Cerastium fontanum* leaf



Part of the telium showing the teliospores, stained with aniline blue

(Photos Gill and Bert Brand)

I have not recorded *Puccinia arenariae* (or *M. caryopyllacearum*), on *Cerastium fontanum*, Common Mouse-ear, despite examining a large number of plants; but Gill Brand recently found a single pustule of *P. arenariae* on a leaf. This may suggest that this host is much less susceptible to infection than the other hosts, and I often speculate that hairier plants get less rust infection or become infected later than less hairy ones. This is only a personal thought/observation and may be completely untrue.

Further hosts on which *Puccinia arenariae* has been found include *Arenaria serpyllifolia*, Thyme-leaved Sandwort, other *Sagina* species and *Spergula arvensis*, Corn Spurrey.

A full list of hosts known up to 2004 can be found in the 2 rust checklists, (Henderson 2000, 2004), and also see Microfungi on Landplants, (Ellis & Ellis 1997) and the FRDBI.

Nigel Stringer recently reported a first GB record confirmed of *Puccinia arenariae* on *Myosoton aquaticum*, Water Chickweed, which was found by Roy Lemmon in VC 55 on 28/10/2010, (pers. comm.). This demonstrates that all members of the Pink family should be considered as potential hosts.

I'm sure I speak for Gill as well in saying that I hope a legacy of the current survey will be an increased awareness of rust fungi in general and encourage more recording. Perhaps some recorders will now extend their recording to these other *P. arenariae* hosts……..

References:

Ellis and Ellis, (1997). *Microfungi on Land Plants - An Identification Handbook*, Richmond Publishing

Henderson, D.M., (2000). *A Checklist of the Rust Fungi of the British Isles*, BMS

Henderson, D.M., (2004). *The Rust Fungi of the British Isles*, BMS

These 2 checklists are out of print but are available as pdfs from http://www.aber.ac.uk/waxcap/links/index.shtml

Wilson M. and Henderson, D.M. (1966). *British Rust Fungi*, Cambridge University Press

Reprint P/B (2011), CUP

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Debbie Evans November 2011