A. Heavily infected stems and flower heads; bar = 5 cm. B. Detail of ascomata on leaf surface; bar = 500 µm. C. Cluster of ascomata slightly squashed; some have cracked open and from each of those an ascus is protruding; bar = 200 µm. D. Young ascus; bar = 20 µm. E. Ascospore; bar = 10 µm.


*Erysiphe dipsacacearum* Tul. & C. Tul., as ‘dipsacearum’, *Selecta Fungorum* Carpologia 1: 210 (1861). [IndexFungorum 141455]

*Sphaerotheca dipsacacearum* (Tul. & C. Tul.) L. Junell, as ‘dipsacearum’, *Svensk Botanisk Tidskrift* 61: 227 (1967). [IndexFungorum 339447]

**Diagnostic features.** Causing a white powdery mildew on living leaves, stems and flower heads of members of the Dipsacaceae.

**On natural substratum. Habit** powdery mildew colonies on living leaves, stems and flower heads, sometimes looking dark on dying and dead leaves if production of ascomata is abundant. *Mycelium* external
to the plant, colourless to very pale brown, branched, septate, thin-walled, smooth, 5–6 µm wide. 

**Anamorph.** Conidiophores colourless, thin-walled, smooth, septate, unbranched, up to c. 8 µm wide, each with a single conidiogenous cell at the apex. Conidiogenous cells colourless, thin-walled, smooth, 16–22 × 7–10 µm. Conidial development initiation holoblastic; maturation synchronous; delimitation by a 2-ply septum; secession schizolytic; in the material studied, only one conidium was seen associated with each conidiogenous cell, and no conidia were seen with more than one secessional scar. Conidia very few, colourless, aseptate, smooth, 24–32 × 14–18 µm. 

**Teleomorph.** Ascomata eliothecial, superficial, globose, at first yellowish, later becoming brown then dark brown, 70–150 µm diam., each containing one ascus; ascomatal wall composed of brown to dark brown thin-walled cells, 7–12 µm diam., forming a textura angularis; appendages present, but poorly-defined and looking like mycelium, straight to flexuous, brown, thin-walled, septate, mostly unbranched, 4–6 µm wide. 

Ascii subglobose to short-ellipsoid, rather thick-walled, 60–80 × 50–65 µm, each containing 4–6 ascospores. Ascospores elongated ellipsoid, sometimes slightly curved, colourless, thin-walled, smooth, 28–38 × 13–18 µm, often with one large guttule. Interascal tissue not noted.


**ASSOCIATED ORGANISM OF TYPE SPECIMEN.** Dipsacus sylvestris.

**INTERACTIONS & HABITATS:** A terrestrial fungus, obligately parasitic on species of the *Dipsacaceae*, but not causing a serious disease resulting in death of the plant. Apart from observations where *Ampelomyces quisqualis*, *Cladosporium cladosporioides* and *Septoria cephalariae-alpinae* were also present, nothing is known about associations and interactions with organisms other than the host plant. This species has been recorded from the following habitats: amenity & protected areas (gardens including botanic gardens, parkland with scattered trees); freshwater (marshes); grassland (basic/calcareous, rough pasture); margins (hedgerows, track sides); ruderal (land reclamation sites, quarries, wasteland, woodland edges); woodland (broadleaved semi-natural, mixed, plantations, scrub on limestone).

**GEOGRAPHICAL DISTRIBUTION:** NORTH AMERICA: USA (Washington). ASIA: Afghanistan, Armenia, Azerbaijan, Iran, Iraq, Israel, Kazakhstan, Kyrgyzstan, Lebanon, Pakistan, Tajikistan, Turkey, Turkmenistan, Uzbekistan. EUROPE: Bulgaria, former Czechoslovakia, France, Germany, Greece, Hungary, Italy, Netherlands, Poland, Romania, Russia (Rostovskaya oblast), Spain, Turkey, Ukraine, UK, former Yugoslavia.

Native to Asia and Europe, status elsewhere unclear. Records up to 150 m above sea level, but probably also occurring at higher altitudes.

**ECONOMIC IMPACTS:** No evaluation has been made of any possible positive economic impact of this fungus (e.g. as a recycler, as a source of useful products, as a provider of checks and balances within its ecosystem, etc.). Since *Dipsacus* species are sometimes regarded as invasives, there may be potential to use *P. dipsacacearum* as part of an integrated biological control programme. No reports of negative economic impacts have been found.
INFRASPECIFIC VARIATION: None reported.

DISPERSAL & TRANSMISSION: By airborne conidia; possibly also by airborne ascospores released in humid conditions.

CONSERVATION STATUS: Information base. Over 500 records (specimens, databases and bibliographic sources combined, excluding duplicates) from at least 1861 to September 2013, with observations in July, August, September, October and November. Estimated extent of occurrence [calculated using http://geocat.kew.org]. Over 7.7 million km² (North America: insufficient data; Asia: 4.1 million km²; Europe: 3.6 million km²). Estimated area of occupancy [calculated using http://geocat.kew.org]. Well over 1000 km². The method for estimating area of occupancy has produced an artificially low figure. The species is likely to be under-recorded, particularly in recent years, because of the small and declining numbers of people with the skills to search for and identify it. Many of the plants with which it is associated are common and widespread species. The species has been described as rare in Israel (VÖYTYUK et al., 2007), but appears to be common elsewhere. Threats. Some records are from nature reserves or other protected areas and, as a result, some populations are more or less safe. With a host plant common in many different ecosystems, including ruderal places, habitat loss is not an issue. The potential impacts of climate change and pollution on this species are not known. Although members of the Dipsacaceae are often used as garden plants, there is no evidence of persecution. Population trend. Not known. In the UK, almost all records are more recent than 1960, and c. 40% are more recent than 2000. Evaluation. Using IUCN criteria (IUCN SPECIES SURVIVAL COMMISSION. 2006 IUCN Red List of Threatened Species [www.iucnredlist.org]. Downloaded on 15 May 2006), the species is assessed globally as Least Concern. In situ conservation actions. None noted. Ex situ conservation actions. No nucleotide sequences were found in a search of the NCBI GenBank database [www.ncbi.nlm.nih.gov], the species is assessed globally as Least Concern. 


Sources additional to those already cited from literature and the internet.

- Checklist of Fungi of the British Isles [www.fieldmycology.net/GBCHKLST/GBCHKLST.asp].
• Cybertruffle [www.cybertruffle.org.uk].
• GBIF [http://data.gbif.org].
• Google [www.google.co.uk].
• National Center for Biotechnology Information [www.ncbi.nlm.nih.gov].
• USDA Fungal Databases [http://nt.ars-grin.gov/fungaldatabases].

D.W. Minter
CABI Europe, Egham, UK