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## A new smut fungus, *Sporisorium centrale* sp. nov., on *Themeda* from Australia

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*Sporisorium centrale* sp. nov. (Ustilaginaceae, Ustilaginomycetes) is described and illustrated from *Themeda triandra* collected in the Northern Territory, Australia. It is compared with *Sporisorium punctatum*.

**Key words:** *Sporisorium punctatum*, taxonomy, Ustilaginomycetes.

### Introduction

The smut fungi on *Themeda* were revised by Vánky (1994) who recognised 18 species in three genera and provided a key. Since then, *Sporisorium exsertiformum* Vánky (1995) and *S. themedae-cymbariae* Vánky (1997) have been described on *Themeda*. Examination of a smut fungus collected from central Australia in 1933 revealed that it was similar to *S. punctatum* (L. Ling) Vánky (1994) but sufficiently different to establish a new species, which is described and illustrated as follows.

***Sporisorium centrale* R.G. Shivas & K. Vánky, sp. nov.** (Figs. 1-4)

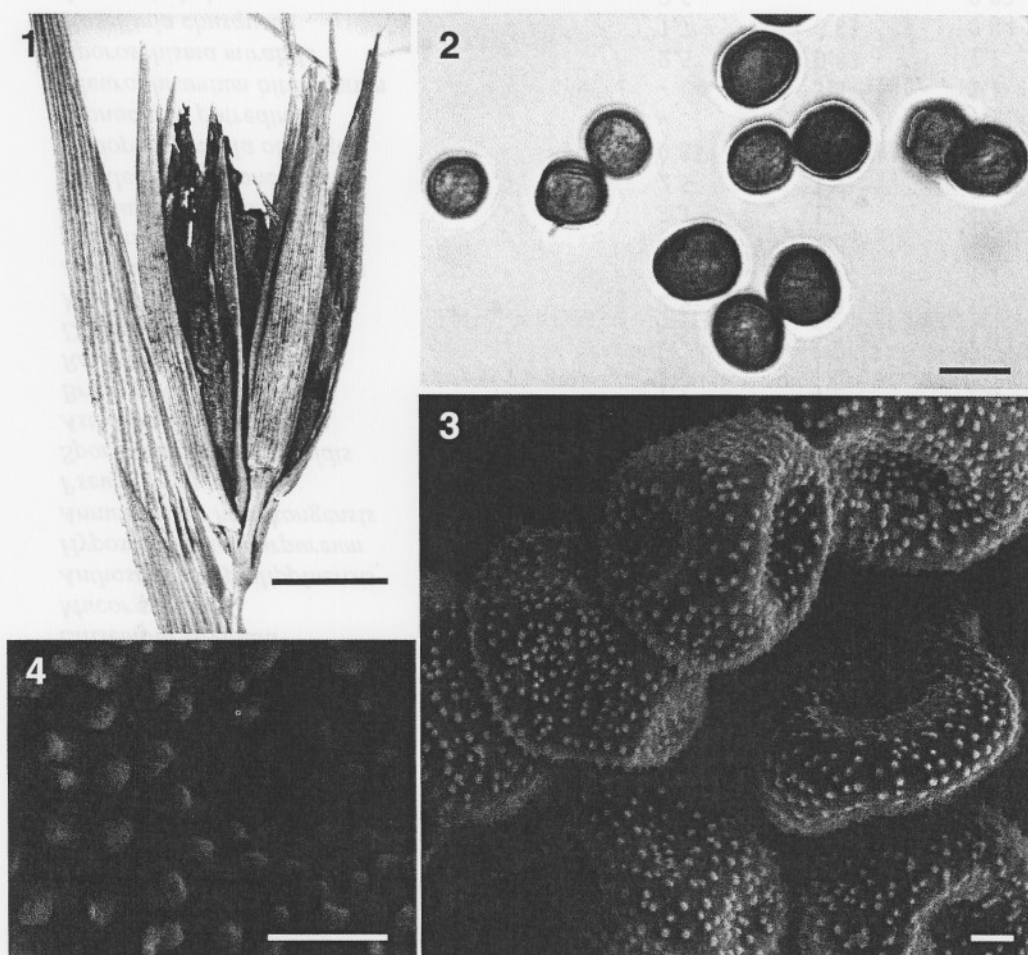
Typus in matrice *Themeda triandra* Forssk., Australia, Northern Territory, 29.IV.1933 (BRIP 26820). Isotypi in PERTH 831034, HUV 19722.

*Sori* spiculas omnes unius racemi occupantes, (aristae numquam visibiles), cylindrici, 1 × 8-12 mm, glumis plerumque celati, peridio cinerascenti usque brunneolo tecti, columella simplex, massa sporarum nigra, pulverea. *Sporae* maturae singulae, globosae, subglobosae, ovoideae usque subpolyedrice irregulares, 7.5-9 × 8-11(-15) µm, rufobrunneae; pariete aequaliter, ca. 1.0 µm crasso, moderate dense, subtiliter punctato. Cellulae steriles non observatae.

*Sori* in all of the spikelets of a raceme (awns never seen), cylindrical, 1 × 8-12 mm, mostly concealed by the glumes, covered by a thin grey to light brown peridium, columella one, stout, simple, spore mass black, powdery.

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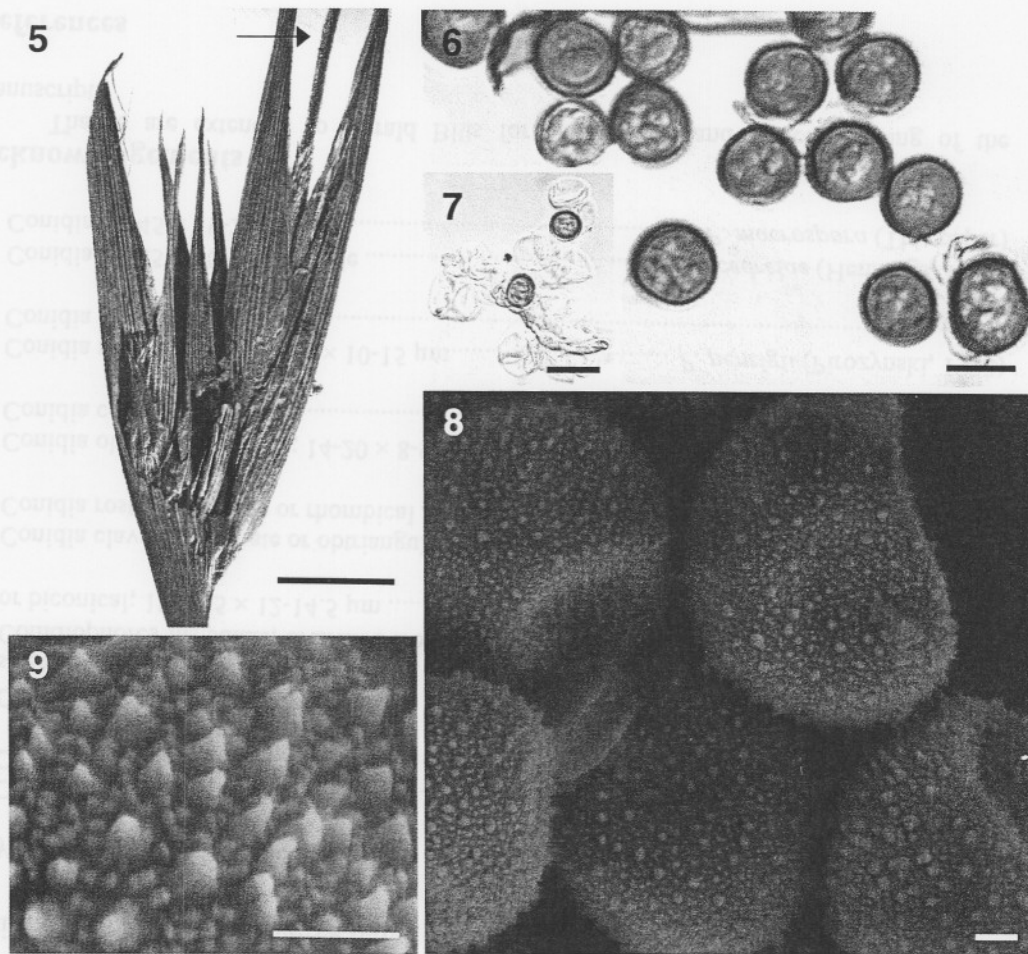


**Figs. 1-4.** *Sporisorium centrale* (from holotype) 1. Sori in an infected raceme. 2. Spores in LM. 3. Spores in SEM. 4. Surface ornamentation of spores in SEM. Bars: 1 = 5 mm; 2 = 10  $\mu$ m; 3, 4 = 1  $\mu$ m.

Spores when mature single, globose, subglobose, ovoid to subpolyhedrally irregular, 7.5-9  $\times$  8-11(-15)  $\mu$ m, reddish-brown; wall even, ca. 1.0  $\mu$ m thick, moderately densely, finely punctate. Sterile cells not seen.

Known only from the type collection in Australia.

*Notes:* *Sporisorium centrale* closely resembles *S. punctatum* in sorus and spore morphology. One difference between these two species is that under Nomarski interference light microscopy (LM) the spore wall of *S. centrale* is finely punctate (Fig. 2), whereas that of *S. punctatum* (BPI 177245!) is finely punctate-verruculose (Fig. 6). Scanning electron microscopy (SEM) showed that the spore wall of *S. centrale* was covered only in coarse verrucae (Fig. 3).



**Figs. 5-9.** *Sporisorium punctatum* (from BPI 177245, holotype) **5.** Sori in an infected raceme (arrow indicates awn of healthy spikelet). **6.** Spores in LM. **7.** Sterile cells and spores in LM. **8.** Spores in SEM. **9.** Surface ornamentation of spores in SEM. Bars: 5 = 5 mm; 6, 8 = 10  $\mu$ m; 7 = 20  $\mu$ m; 9 = 1  $\mu$ m.

The spore wall of *S. punctatum* comprised two types of ornamentation, namely moderate densely, coarse verrucae interspersed with densely, minute verrucae (Figs. 8, 9).

*Sporisorium centrale* appears to infect all spikelets in a raceme (Fig. 1), unlike racemes infected with *S. punctatum* that occasionally have awns, indicating uninfected spikelets (Fig. 5). The spores of *S. centrale* are reddish-brown, whereas those of *S. punctatum* are light brown. The peridium of *S. centrale* is much thinner than the peridium of *S. punctatum*.

<i>Ustilago horrida</i>	-	13	33	14
<i>Ustilago horrida</i>	-	-	2	13
<i>Ustilago horrida</i>	0'83	0'83	43	1'02
<i>Ustilago horrida</i>	-	2	13	33
<i>Ustilago horrida</i>	-	43	2	33
<i>Ustilago horrida</i>	-	0'83	28	33
<i>Ustilago horrida</i>	33	0'83	33	33

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Taxa	Frequency of occurrence (%)			
	Yield	Midrib	Leaf	Overall
<i>Ustilago horrida</i>	-	13	33	14
<i>Ustilago horrida</i>	-	-	2	13
<i>Ustilago horrida</i>	0'83	0'83	43	1'02
<i>Ustilago horrida</i>	-	2	13	33
<i>Ustilago horrida</i>	-	43	2	33
<i>Ustilago horrida</i>	-	0'83	28	33
<i>Ustilago horrida</i>	33	0'83	33	33
<i>Ustilago horrida</i>	-	-	13	33
<i>Ustilago horrida</i>	-	-	83	33
<i>Ustilago horrida</i>	-	-	108	33
<i>Ustilago horrida</i>	83	28	83	84
<i>Ustilago horrida</i>	43	83	13	83
<i>Ustilago horrida</i>	-	33	308	81
<i>Ustilago horrida</i>	13	10	108	842
<i>Ustilago horrida</i>	-	-	383	83
<i>Ustilago horrida</i>	-	143	128	10
<i>Ustilago horrida</i>	133	113	2	10
<i>Ustilago horrida</i>	-	33	13	10'83
<i>Ustilago horrida</i>	-	83	383	113
<i>Ustilago horrida</i>	-	43	383	113
<i>Ustilago horrida</i>	343	333	33	128
<i>Ustilago horrida</i>	10	30	183	183
<i>Ustilago horrida</i>	83	343	183	133
<i>Ustilago horrida</i>	83	30	383	1833
<i>Ustilago horrida</i>	13	128	183	188
<i>Ustilago horrida</i>	13	183	333	183
<i>Ustilago horrida</i>	83	328	343	338

Table 1. Frequency of occurrence of fungi at different levels of diseased corn of *Ustilago horrida* collected in the Philippines (organized in order of overall occurrence)

Ustilago horrida