



Emended description and geographical distribution of *Sporisorium elegantis* (Ustilaginaceae), a species shared between West Africa and India

MARCIN PIĄTEK¹, JOLANTA PIĄTEK² & NOUROU S. YOROU³

¹Marcin Piątek, Department of Mycology, W. Szafer Institute of Botany, Polish Academy of Sciences, Lubicz 46, PL-31-512 Kraków, Poland; e-mail: m.piatek@botany.pl

²Jolanta Piątek, Department of Phycology, W. Szafer Institute of Botany, Polish Academy of Sciences, Lubicz 46, PL-31-512 Kraków, Poland; e-mail: j.piatek@botany.pl

³Nourou S. Yorou, Faculty of Agronomy, University of Parakou, BP 123, Parakou, Benin; e-mail: n.s.yorou@gmail.com

Abstract

Sporisorium elegantis, a smut fungus on *Thelepogon elegans*, is reported for the first time from Benin (West Africa). Based on this collection, an emended description and illustration of this rare species are provided. The geographical distribution of *Sporisorium elegantis* is documented for Benin, Nigeria and India. The disjunctive occurrence of this species between (western) Africa and India is interesting, though not exceptional in smut fungi. The mechanisms responsible for such a distribution pattern are not known.

Key words: geographical disjunction, *Sporisorium*, smut fungi, Sudanian savanna, Ustilaginomycotina

Introduction

The smut fungi of Africa include 427 reported species (Vánky *et al.* 2011), some of which are common, but many of which are inadequately known or reported only from their type localities. Furthermore, many species are described and illustrated incompletely or inaccurately (M. Piątek, pers. obs.). It is the long-standing goal of the first author to re-describe and illustrate rare African smuts when new records are detected from analyses of historical materials deposited in herbaria or when freshly collected in field surveys. In addition to emended descriptions and new country reports of known species (Piątek 2006a, 2009a, 2010, Piątek & Vánky 2007, Piątek *et al.* 2008, 2012), previous studies reported several new species from Africa (Piątek 2006b, 2009b, Piątek & Vánky 2005, 2007, Vánky & Piątek 2006, Piątek *et al.* 2008).

The recent field surveys in western Africa, between 2007 and 2013, resulted in a large collection of smut specimens, including species rare and new to science, and accompanied by some ecological information (habitat, host range within population) assembled in the natural environment. Such information is rarely available in scientific publications and field observations may deliver valuable data concerning ecological interactions between smut fungi and host plants in their natural habitats. The smut on *Thelepogon elegans* Roemer & Schultes (1817: 46) collected during one of these surveys in Benin appeared to represent a rarely reported species, *Sporisorium elegantis* Vánky (1997: 132). We have emended the description and illustrated this species based on the recent collection. New biogeographical and ecological information for this species is provided.

Materials and methods

The characteristics of sori, spore balls, spores, peridial and sterile cells were studied using dried herbarium material. The herbarium specimens are deposited in K, KRAM F and the private collection of M. Piątek. The specimens were examined by light microscopy (LM) and scanning electron microscopy (SEM). The species description and measurements are based on a specimen from Benin. For light microscopy (LM), small pieces of sori were mounted in

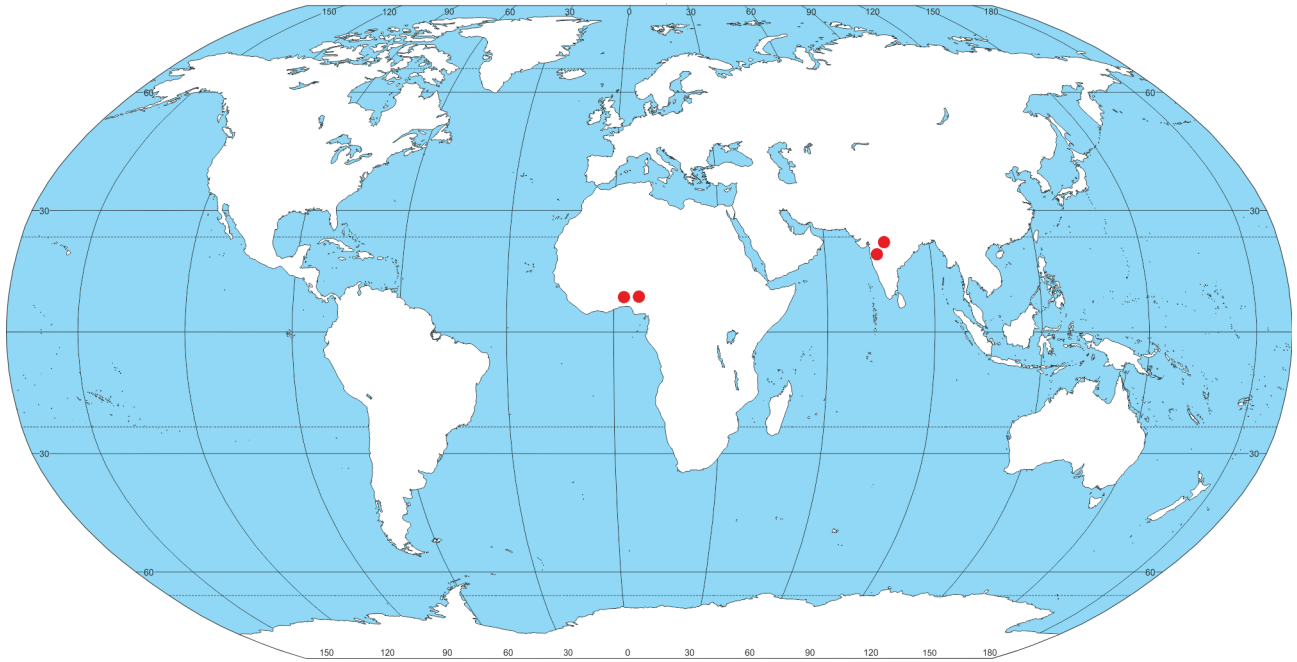


FIGURE 4. The geographical distribution of *Sporisorium elegantis*.

The second species attacking *Thelepogon elegans*, that is *Anthracocystis thelepogonis*, differs by having sori developed in considerably swollen ovaries, which are localized to single ovaries of inflorescences. The spores are united in rather permanent spore balls and there are no sterile cells (Vánky 1997). *Anthracocystis thelepogonis* is presently known only from the type locality in India and an additional locality in East Timor (McTaggart *et al.* 2012, Vánky 2012). *Sporisorium elegantis* was reported from three localities in India and Nigeria, and now the fourth record in Benin is added to its global range (Fig. 4). The type locality in the protologue is indicated very precisely (“India, Maharashtra State, 36 km N.W. urbe Pune, pr. National Defence Academy”). Two paratype locations, on specimens deposited in IMI and H.U.V., are given as India and Nigeria respectively (Vánky 1997). The examination of duplicates of these two collections deposited in K (not mentioned in protologue but comprising the same gathering, see specimens examined) enabled us to give accurate localizations for these two collections. The detailed localization of records is valuable for preparing the distribution maps of smut fungi. The disjunctive occurrence of *Sporisorium elegantis* between (western) Africa and India is interesting, although not exceptional in smut fungi. The mechanisms responsible for such a distribution pattern are not known. *Sporisorium elegantis* is probably a rare species; in three surveys to Benin, Ghana and Togo during 2011–2013, it was observed only in one place, despite the rather common occurrence of its host plant, *Thelepogon elegans*. Likewise, this smut fungus has not been collected in extensive smut surveys in different eastern African countries, for example Ethiopia (Vánky 2005), Uganda (Vánky *et al.* 2011), and Malawi, Zambia and Zimbabwe (Vánky & Vánky 2002). This could give some hint that the species is indeed rare.

Acknowledgements

We thank Anna Łatkiewicz (Kraków, Poland) for her help with SEM pictures, and the Curator of K for the loan of the specimens. This work was supported by the National Science Centre (NCN) of Poland (project no. N N303 414037 for the years 2009–2014).

References

- Clayton, W.D., Vorontsova, M.S., Harman, K.T. & Williamson, H. (2006 onwards) GrassBase – The Online World Grass Flora. Available from: <http://www.kew.org/data/grasses-db.html> (accessed: 22 November 2013).
- McTaggart, A.R., Shivas, R.G., Geering, A.D.W., Vánky, K. & Scharaschkin T. (2012) Taxonomic revision of *Ustilago*, *Sporisorium* and

- Macalpinomyces*. *Persoonia* 29: 116–132.
<http://dx.doi.org/10.3767/003158512x661462>
- Piątek, M. (2006a) *Doassansiopsis tomasii*, an aquatic smut fungus new to Uganda. *Polish Botanical Journal* 51(2): 173–176.
- Piątek, M. (2006b) *Sporisorium kenyanum*, a new smut fungus with long twisted sori on *Setaria pallide-fusca* in Kenya. *Polish Botanical Journal* 51(2): 159–164.
- Piątek, M. (2009a) *Sporisorium themedae* new to Mauritius, and *Tilletia mauritiana* new to Madagascar. *Polish Botanical Journal* 54(1): 21–26.
- Piątek, M. (2009b) Two smut fungi on *Ischaemum*: *Sporisorium austroafricanum* sp. nova and *Tolyposporium bogoriense* revisited. *Annales Botanici Fennici* 46(5): 425–430.
<http://dx.doi.org/10.5735/085.046.0508>
- Piątek, M. (2010) *Sporisorium ignotum* – a remarkable smut fungus from Zimbabwe originally classified in the genus *Ustilago*. *Polish Botanical Journal* 55(2): 309–314.
- Piątek, M. & Vánky, K. (2005) *Cintractia majewskii*, a new smut fungus (Ustilaginomycetes) on *Fimbristylis* (Cyperaceae) from Africa. *Polish Botanical Journal* 50(1): 1–6.
- Piątek, M. & Vánky, K. (2007) *Ustilago aldabrensis*, a new species from Seychelles, and two other smut fungi on *Dactyloctenium*. *Mycological Progress* 6(4): 213–219.
<http://dx.doi.org/10.1007/s11557-007-0536-y>
- Piątek, M., Piątek, J. & Mossebo, D.C. (2012) Recently discovered collections extend the geographical range of the smut fungus *Sphacelotheca polygoni-serrulati* to Cameroon and Zambia. *Polish Botanical Journal* 57(1): 285–293.
- Piątek, M., Vánky, K., Mossebo, D.C. & Piątek, J. (2008) *Doassansiopsis caldesiae* sp. nov. and *Doassansiopsis tomasii*: two remarkable smut fungi from Cameroon. *Mycologia* 100(4): 662–672.
<http://dx.doi.org/10.3852/07-189r>
- Roemer, J.J. & Schultes, J.A. (1817) *Systema vegetabilium: secundum classes, ordines, genera, species. Cum characteribus differentiis et synonymis [Caroli a Linné ...]. Editio nova, speciebus inde ab editione XV. Detectis aucta et locupletata. Vol. 2.* J.G. Cottae, Stuttgart.
<http://dx.doi.org/10.5962/bhl.title.825>
- Simon, B.K. (1993) Studies in Australian grasses 8. A new species of *Thelepogon* (Andropogoneae: Ischaeminae) for Australia. *Austrobaileya* 4: 105–108.
- Vánky, K. (1997) Taxonomical studies on Ustilaginales. XV. *Mycotaxon* 62: 127–150.
- Vánky, K. (2005) The smut fungi of Ethiopia and Eritrea. *Lidia* 6: 93–120.
- Vánky, K. (2012) Smut fungi of the world. APS Press, St. Paul, Minnesota. 1480 pp.
- Vánky, K. & Piątek, M. (2006) The genus *Testicularia* (Ustilaginomycetes). *Mycologia Balcanica* 3(2–3): 163–167.
- Vánky, K. & Vánky, C. (2002) An annotated checklist of Ustilaginomycetes in Malawi, Zimbabwe and Zambia. *Lidia* 5(6): 157–176.
- Vánky, K., Vánky, C. & Denchev, C.M. (2011) Smut fungi in Africa – a checklist. *Mycologia Balcanica* 8: 1–77.