



ISSN: 0975-833X

RESEARCH ARTICLE

FIRST RECORD OF *PODAXIS PISTILLARIS* (L. EX PERS.) FROM JIZAN REGION IN SAUDI ARABIA

1, 2 Ali, E. Gaafar and *1, 3 Deiaa A. El-Wakil

¹Department of Biology, Faculty of Science, Jazan University, Kingdom of Saudi Arabia

²Department of Botany, Faculty of Science, New Valley Branch, Assuit University, Egypt

³Plant Pathology Research Institute, Agricultural Research Center, Giza, Egypt

ARTICLE INFO

Article History:

Received 23rd November, 2014

Received in revised form

07th December, 2014

Accepted 07th January, 2015

Published online 28th February, 2015

Key words:

Podaxis pistillaris, medicinal, food
Fungus, Agaricaceae, Fruiting bodies.

ABSTRACT

A basidiomycete fungus was collected from Jizan region of Saudi Arabia; described and illustrated. The fruiting bodies and spores showed some variations in size and shape, which match with the description of *Podaxis pistillaris*. This is the first record of the fungus in Jizan; southern region of Saudi Arabia. A noticeable variation on the colour of the spores and their maturity was recorded during the study. Basidiomycota (Gasterocarp) is a medicinal fungus; it is 13-16 cm in height, 1.8-2.6 cm in diam., whitish at early stages becoming yellowish to rusty-brown in color at the maturity, covered with a few scales when young. Also, the development stages of the fruiting body were noticed in this study.

Copyright © 2015 Ali E. Gaafar and Deiaa A. El-Wakil. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

Basidiomycota is a famous family of fruiting fungi. One of this family is *Podaxis pistillaris*; which is considered as a gastroid mushroom within the class Agaricaceae (Mao, 2000). This fungus is commonly known as false Shaggy. This species has previously been described and synonymised by few workers (Morse, 1933; Keirle et al., 2004). In Saudi Arabia a large quantities of *Podaxis pistillaris* are collected from plains and desert by nomads during the rainy season. The fruiting bodies are used as a food source either alone or in combination with other food as a source of flavor (Khaliel et al., 1989). *Podaxis pistillaris* earlier has been reported from Al-Mekwah City, Al-Baha, Saudi Arabia (Yehia and Al-Ghamdi, 2014). *Podaxis pistillaris* fruiting bodies appear after rains, generally in the spring and early summer (Khan, 1979). Medicinal properties of this fungus have well been documented for the treatment of inflammation (Mao, 2000), skin diseases (Gupta and Singh, 1991) and as antimicrobial agents (Panwar and Purohit, 2002). Although the edibility and nutritive values of this mushroom have been

tested (Gupta and Singh, 1991), yet not commercialized as a food supplement due to hard nature of the fruiting body. The present work was designed to record *Podaxis pistillaris* (L.Pers.) in Jizan region for the first time. Also, to illustrate some of the important morphological characters and focusing on the economic importance of the basidiomycete fungus *Podaxis pistillaris* (L.Pers.).

MATERIALS AND METHODS

The collected samples of *Podaxis pistillaris* were maintained in 70% alcohol only for two days, then submitted to morphological examinations like the mature stage and spores germination and their colour. The fungus was noticed on the open field. Longitudinal sections of the fruiting body were taken and the observed characters were recorded. A small piece of the fungus was examined internally and from surface tissue of the fruiting body, the tissue was dissected with the help of dissection needles and mounted in water. After this the samples was stained in cotton blue, mounted in Lacto phenol. Microscopic features of *Podaxis pistillaris*, were carefully observed and photographs were taken by a digital camera attached to a microscope. The specimens were identified after careful perusal of literature (Morse, 1933; Keirle et al., 2004). The specimens of *Podaxis pistillaris* were kept in the herbarium of Biology Department, College of Science, Jazan University.

*Corresponding author: ^{1,3}Deiaa A. El-Wakil,

¹Department of Biology, Faculty of Science, Jazan University, Jazan, Kingdom of Saudi Arabia.

³Plant Pathology Research Institute, Agricultural Research Center, Giza, Egypt.

RESULTS

Cylindrical fruiting bodies were noticed on disturbed soil filling of a pond beside the road towards Al-karbus roadway (Jizan region). The fungus was identified as *Podaxis pistillaris* (Morse, 1933). Morphological characteristics of *Podaxis pistillaris*: One of the family Basidiomata (Gasterocarps); it was 13-16 cm in height, 1.8-2.6 cm in diam., whitish at early stages becoming yellowish to rusty-brown in color at maturity, covered with few scales when young. Pileus was cylindrical to ellipsoidal, 6-8cm in length, 3-5 cm in diam., white becoming yellowish-brown in color. It was fragile, leathery, and woody at maturity, stipitate and pileate, odorless Fig. 1. (A, B and C). Concerning the Peridium it was non-dehiscent and remained fused with the stipe, cracking or splitting when dried to release spores. Stipe 6-13 cm long, 1.5- 2.2 cm diam., white to yellow brown, straight, bulbous at the base, possessing a fibrous to woody texture, hollow in the centre when mature. Gleba was pink in color when young becoming reddish to brown at maturity (Fig. 1. D). In Fig. 2. (A, B and C). Basidiospores was 10-14 μm , globose to sub-globose, smooth, thick walled, purple when young becoming reddish to dark brown at maturity, with a germ pore. The hymenium layer was borne on irregular lamellate tramal and it breaks down the development of the capitulum. For the basidiospores mass it was emerged in capitulum of *Podaxis pistillaris* Fig. 2. (D, E and F). as reported by (Khatri *et al.*, 2009). For stipe of *Podaxis pistillaris* (L.Pers.), the thickness of the stipe are ranged from 5-9 cm and the thickness of the stipe may reach up to 1 mm.

Fig.3. Showing a map of jazan region south of Kingdom of Saudi Arabia where the present work was designed for studying *Podaxis pistillaris* in this area.

DISCUSSION

Earlier investigators reported the presence of *Podaxis pistillaris* during rainy seasons, they noticed that the fruiting bodies are varied in shapes, color, size which may be due to the variation of fruiting bodies, species and growing stage (Hashem and Al-Rahmah, 1933 and Gardiner *et al.*, 2005). Our study showed that the examined specimens were similar to the species of the collected *Podaxis pistillaris* samples (Panwar and Purohit, 2002). The specimens of *Podaxis pistillaris* were kept in the herbarium of Biology Department, College of Science, Jazan University. The morphological characters was recorded earlier in Al- Mekwah city, Albaha, Saudi Arabia by (Yehia and Al-Ghamdi, 2014). The obtained data are agreed with those mentioned by other investigators (Khatri *et al.*, 2009). It is used in herbal remedies in the traditional folk medicine. It can be considered as a potential source for the creation of a new products and drugs (Lindequist and Niedermeyer, 2005). The present study showed the importance and morphological features of *Podaxis pistillaris* in medical industry as mentioned before (Al-Fatimi, 2001 and Kreisel and Al-Fatimi, 2004).

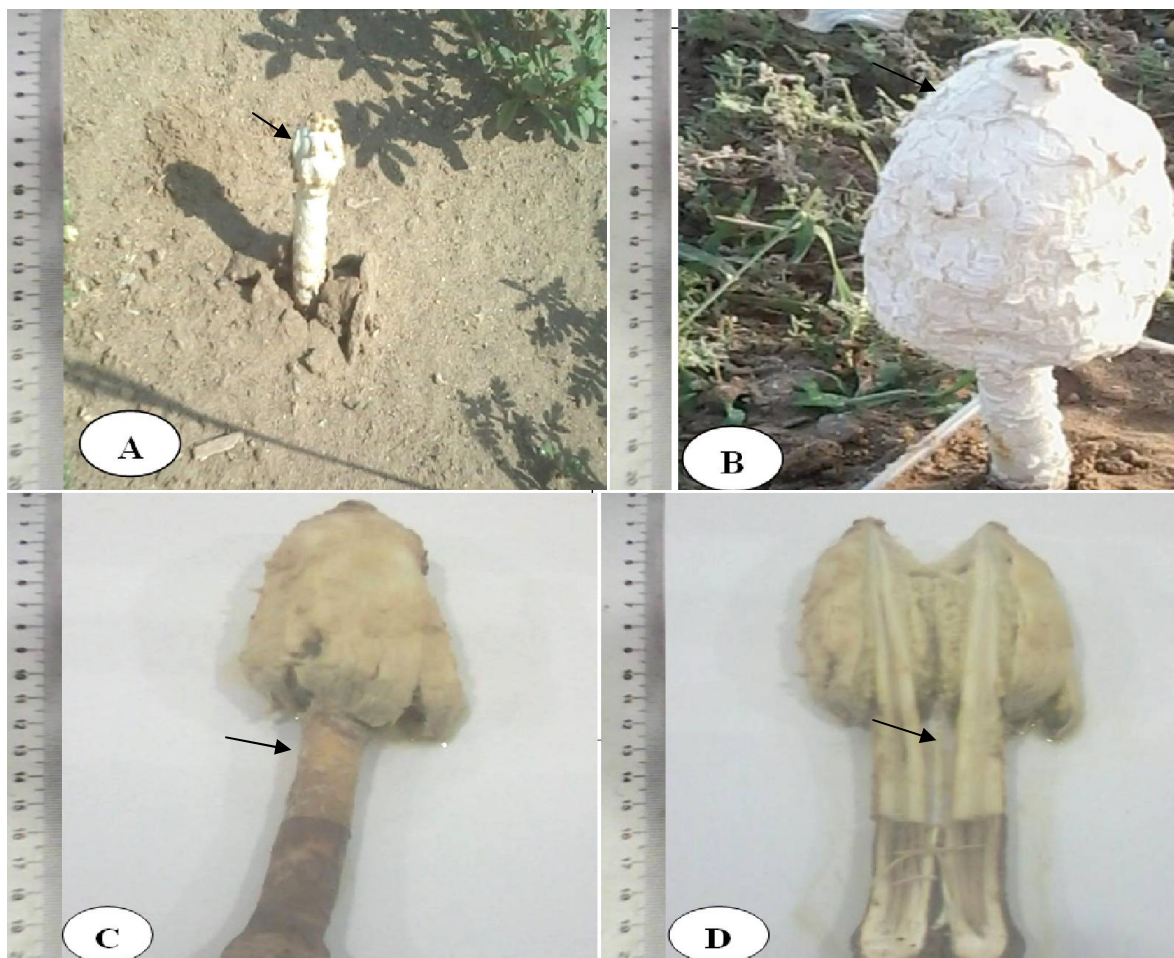


Fig.1. Showing a field habitat of the fruiting body of *Podaxis pistillaris* at different stages of development (A & B), Earlier stage (A), Mature stage (B) body submitted to examination in lab (C). Longitudinal section for the fruiting body (D)

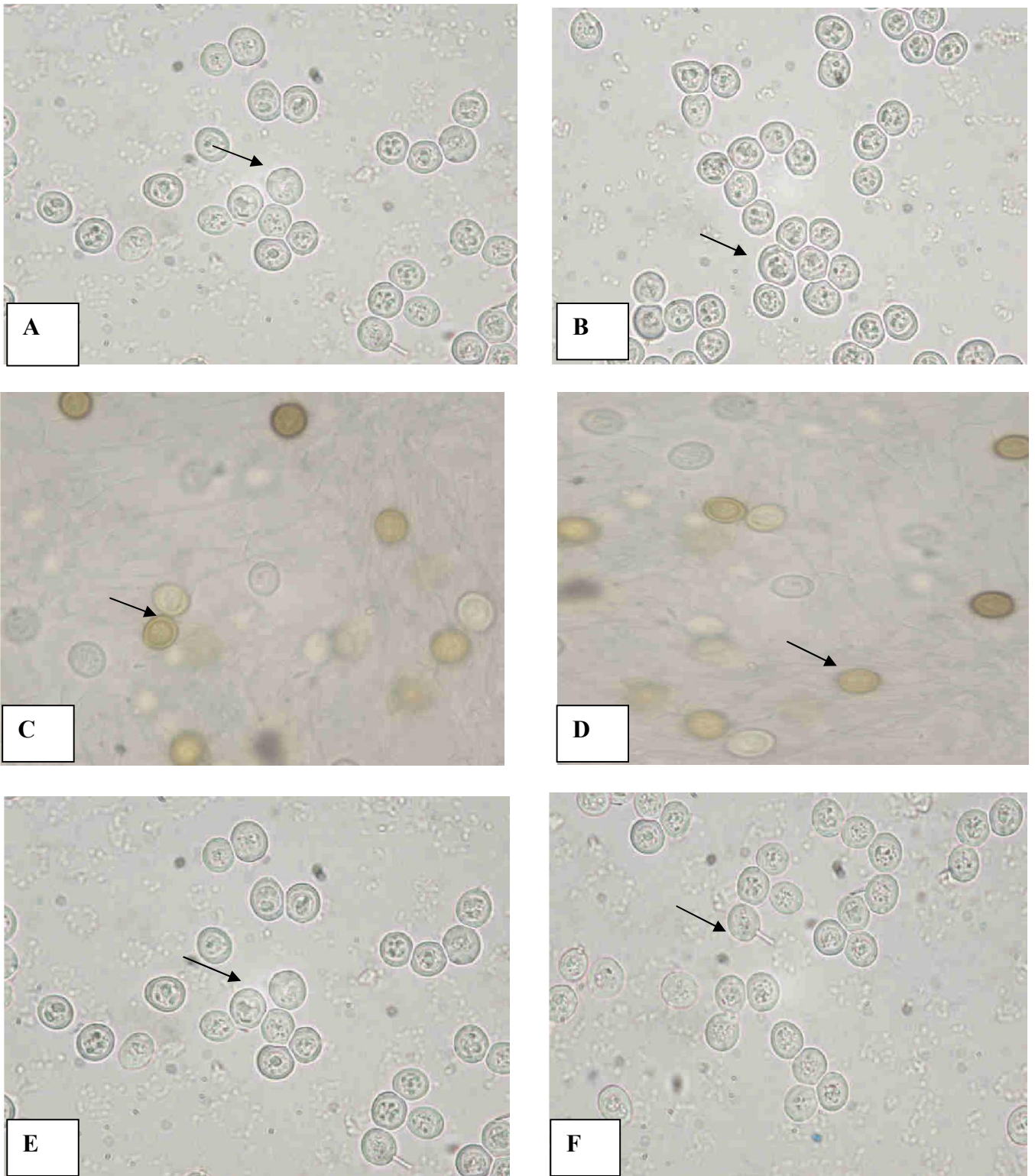


Fig.2. Showing a mature spores of *Podaxis pistillaris* X100 (A &B), Earlier stage of spore development in fruiting body tissue development X100(C), Mature stage of spore development of Fruiting body X100 (D). Earlier stage of spore germination X100(E). Mature stage showing the basidiospores spore germination X100 (F)

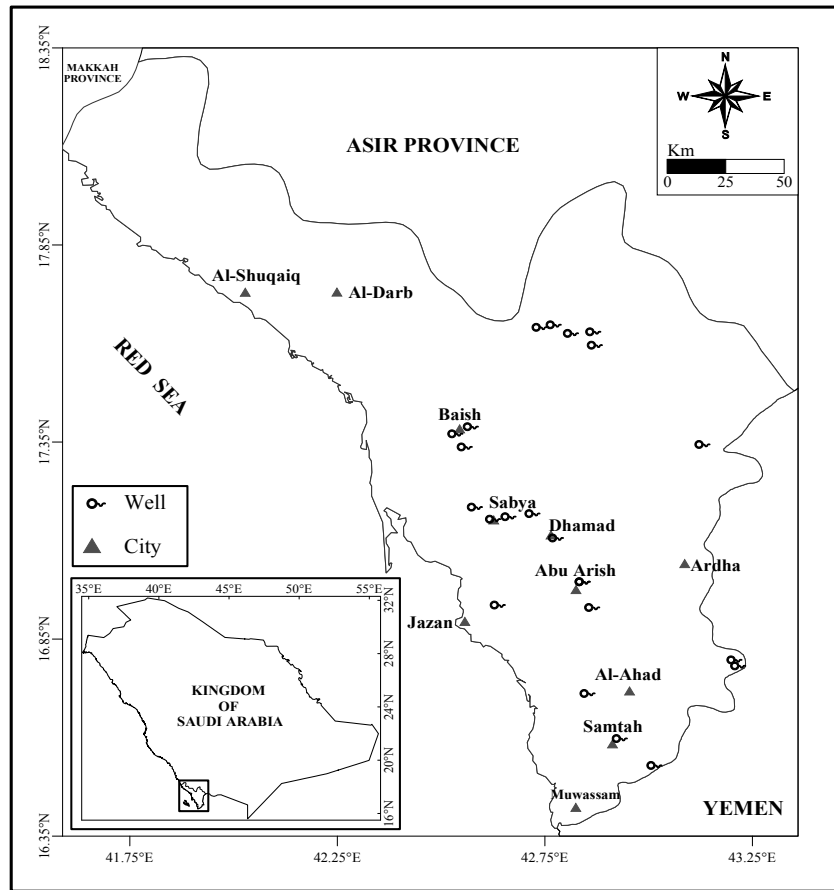


Fig.(3) A map showing jazan region southern of Saudi Arabia

CONCLUSION

The present work was designed to record *Podaxis pistillaris* (L.ex Pers.) in Jazan region (southern of Saudi Arabia); for the first time and to focus on some of the morphological characters of this fungus for its importance in medical and food industries. Also, it was considered as a source of edible food. Great efforts must be directed towards this kind of basidiomycota fungal group for its economic importance.

REFERENCES

- Al-Fatimi, M. A. M. 2001. Isolierung und Charakterisierung antibiotisch wirksamer Verbindungen aus *Ganoderma pfeifferi* Bres. und aus *Podaxis pistillaris* (L.: Pers.) Morse. Universita't Greifswald, (in German).
- Gardiner, D. M, Waring, P, Howlett, B. J. 2005. The class of fungal class of fungal toxins: distribution, mode of action, and biosynthesis. *Microbiology*, 151:1021-32.
- Gupta, S. and Singh, S. P. 1991. Nutritive value of mushroom *Podaxis pistillaris*, *Indian Journal of Mycology and Plant Pathology*, 21(3): 273-276.
- Hashem, A. R. and Al-Rahmah, A. N. 1993. Growth of *Podaxis pistillaris* collected from Saudi Arabia at different concentration of cadmium and lead. *J. King Saud University, Science*, 5 (2): 127-135.
- Keirle, M. R, Hemmes D. E. and Desjardin, D. E. 2004. Agaricales of the Hawaiian Islands 8, Agaricaceae: Coprinus and *Podaxis*; Psathyrellaceae: *Coprinopsis*, *Coprinellus* and *Parasola*, *Fungal Diversity*, 15: 33-124.
- Khaliel, A. S., Abou-Heilah, A. N. and Kassim, M. Y. The nutrient composition of *Podaxis pistillaris* Arab. *J. Science. Res.*, 7. No.3, 121-128.
- Khan, S. M. and Khan, D. A. 1979. Temperature studies on *podaxis pistillaris* *Mycologia* 71, 861-867.
- Khatri, R. K., M. P. Thakur and V. K. Yadav, 2009. Mushroom flora of Madhya Pradesh and Chattisgarh, *J.Basci Applied Mycol.*, 8:102-106.
- Kreisel, H. and Al-Fatimi MAM. 2004. Basidiomycetes and larger ascomycetes from Yemen. *Feddes Report*; 115:547-61.
- Lindequist, U., Niedermeyer, T. H. J. and Ju'lich, W. D. 2005. The pharmacological potential of mushrooms. *CAM*; 2:285-99.
- Mao, X. L. 2000. The Macro Fungi of China. Zhengzau: Henan Science and Technology Press (Chinese).
- Morse, E. E. 1933. A study of the genus *Podaxis*. *Mycologia* 25(1): 1-31.
- Panwar, C. and Purohit, D. K. 2002. Antimicrobial activities of *Podaxis pistillaris* and *Phallorinia inquinans* against *Pseudomonas aeruginosa* and *Proteus mirabilis*, *Mushroom Research*, 11(1): 43-44.
- Yehia A. G. Mahmoud and Abdulaziz Yahya Al-Ghamdi, 2014. *Podaxis pistillaris* (L. ex Pers.) Fr. recorded from Al Mekwah City, Albaha, Saudi Arabia. *Research Journal of Microbiology*, 9: 111-114.
