

## ALSE SMUT, A NEW DISEASE ON RICE IN EGYPT

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### ABSTRACT

False smut caused by *Ustilagoideae virens* was reported on rice, for the first time in Behaira province, Northern Egypt 1998. In 1999, the disease was observed in four Governorates namely: Kafr-El-Sheikh, El-Sharkia, El-Gharbia and Dakahlia. Disease severity varied in different locations and on different rice cultivated cultivars. Symptom development, spore formation and spore forming structures were studied.

**Key words:** Rice, False smut, *Ustilagoideae virens*

### INTRODUCTION

False smut, also, known as green smut of rice, is a cosmopolitan disease (Vanky, 1998 and Wang *et al.*, 1998). It was reported in many parts of the world including Gabon (Manser, 1984), China (Wang-Xiaoli, 1987; Du-Yi *et al.*, 1990; Chen-Youg'shui, 1991 and Liu *et al.*, 1993), India (Anand *et al.*, 1985, Singh, *et al.*, 1987; Ram-D. 1994), Japan (Yaegashi, *et al.*, 1989), Puerto Rico (Pantoja and Medina, 1988) and recently in Arkansas, USA (Cartwright *et al.*, 1999).

Although false smut is generally regarded as a minor disease in many rice-growing areas, epidemic development redundant was reported in India, Burma, Peru and Philippines (Webster and Gunnell, 1990).

According to Egyptian quarantine regulations, false smut - infected rice grains are not allowed to get into the country (low No. 52, 1969).

### MATERIALS AND METHODS

During the course of this study several rice plantation fields at different locations in the main rice producing Governorates in Northern Delta were examined. Disease severity was assessed according to the assessment keys suggested by James (1971). Samples were collected for laboratory studies. The fungus was isolated on PDA medium using techniques suggested by Riker and Riker (1936). Identification of isolated fungus was carried out according to the identification key of Mulder & Holliday (1971).

### RESULTS AND DISCUSSION

False smut, caused by *Ustilagoideae virens* (Cke.) Tak., Was first observed on rice plantations, just before maturity at Hosh-Easa, Behaira

Governorate, during late summer season of 1998. The disease was later reported in several Governorates on different rice cultivars with variable infection levels (Table 1). Infection rate was reported on the four major rice cultivars namely: Giza 101, Giza 102, Giza 171 and Giza 172. Infection rate, however, varied from 0.5 % to 20 % according to rice cultivars as well as location. Generally disease was sever in Behaira and less sever in El-Sharkia and Dakahlia.

Disease symptoms develop as globose to circular or irregular shape spore balls (Fig.1). Spore balls emerge through glumes replacing rice kernels with a diameter equal to or five times as kernel diameter (Fig. 1, A - D). Spore balls are yellowish golden at first. The colour gradually turns to olive or olivaceous-black in colour. The inner most core of the ball consists of hard and tightly woven fungal mycelium. Spore ball core is surrounded by several layers of spores with inward degree of maturity. As the spores mature, they turn dark in colour (Fig. 3). The remained floral parts are usually incorporated into the spore ball (Fig. 4). Full mature spore balls, often, turn into one to several hard irregular dark variable size sclerotia (Fig. 5). Generally, few kernels of the panicle are affected (Fig. 2).

Fungal spores are, almost spherical smooth when young and warty when mature with average diameters of  $3 \times 5 \mu\text{m}$  (Fig. 3). Spores are formed along the hyphae in a manner of chlamydo spores, according to Mulder & Holliday (1971) the fungus was classified to Hyphomycetes, group Mitosporangium-phaeosporae. formation (Fig. 3b).The fungal spores germinate by germ tubes which might form secondary conidia (Fig. 6, a & b).

According to the available literature the incidence of false smut disease is considered a first record in Egypt. More attention should be payed to the disease which could express a serious passive impact on rice production in Egypt. Further studies including breeding for disease resistant cultivars, disease epidemiology and source of infection and methods of disease control should be put into consideration.

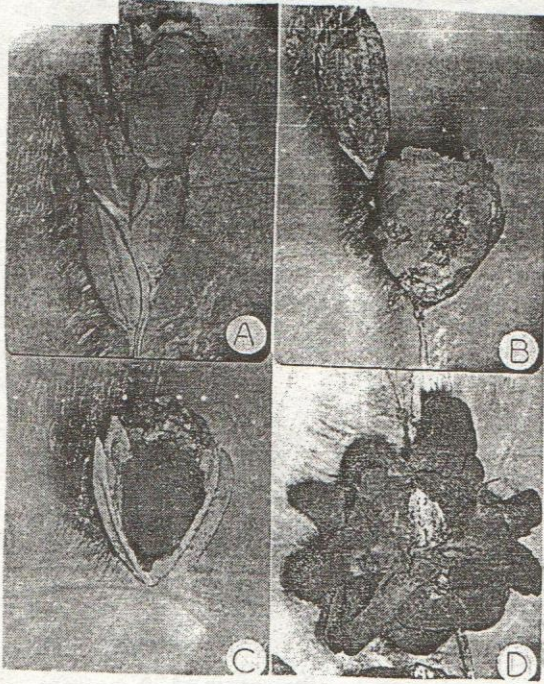


Fig. 1 : Different stages of spore balls of *Ustilago virens* on rice panicles:

- A- Yellow golden colored spore ball.
- B- Slightly dark spore ball.
- C- Olivaceous-colored sclerote spore ball emerging through glumes.
- D- Development of sclerotia.

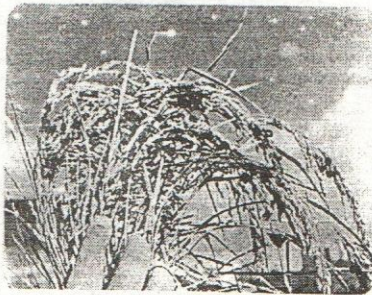


Fig. 2: Dark colored spore balls of *U. virens*. Few spikes are infected in the panicles.

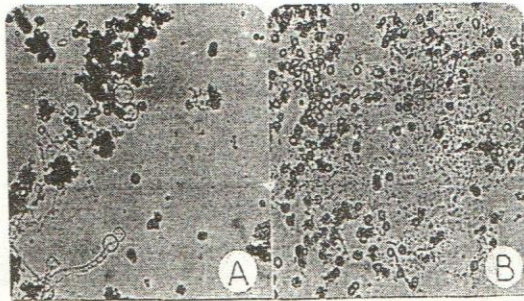


Fig. 3: Chlamyospore-like conidia of *U. virens*  
a) Spores are light colored at first  
b) and then dark in color at maturity

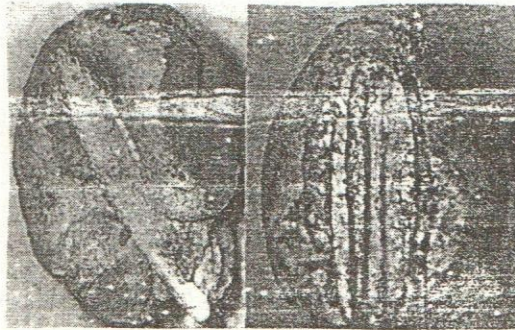


Fig. 4: Floral parts might become a part of the spore balls of the fungus *U. virens*.

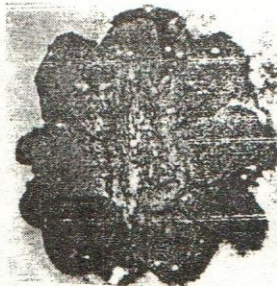
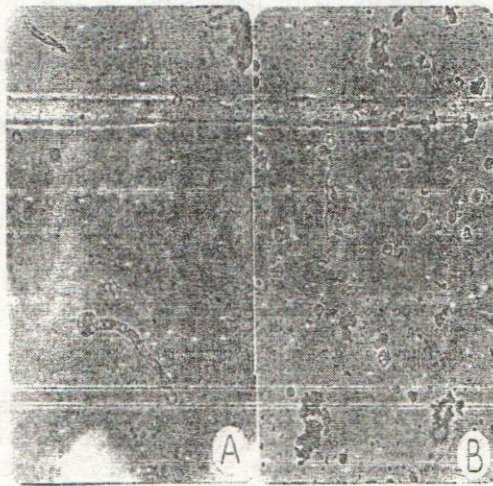


Fig. 5 : Development of sclerotia from mature spore ball of *U. virens*.



**Fig. 6 : Germination of Chlamydospore – like conidia giving germ, tube (a), Germ tube may give rise to secondary conidia (b).**

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التفحم الكاذب مرض جديد على محصول الأرز في مصر  
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تم تسجيل مرض التفحم الكاذب المتسبب عن الفطر (Cke.) Tak. على الأرز بمحافظة البحيرة في الموسم الزراعي لعام ١٩٩٨ - وخلال الموسم الزراعي لعام ١٩٩٩ لوحظ انتشار المرض في أربع محافظات أخرى هي: كفر الشيخ والشرقية والغربية والدقهلية. وقد لوحظ تباين في اختلاف شدة الإصابة بالمرض في المناطق المختلفة وعلى أصناف الأرز المنزرعة. وقد تم دراسة مراحل تكشف الأعراض المميزة للمرض وتطور وتكوين الكتل الجرثومية - وشكل وطرق إنبات جراثيم الفطر.