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# Contribution to the mycobiota of Egypt

## *Neurospora tetrasperma* Shear & Dodge; a new record to Egypt

**A. H. Moubasher[1], A. M. Moharram and Zeinab Soliman**

**Assiut University Mycological Centre, Assiut University, Assiut, Egypt**
[1]Corresponding author: e-mail: moubasher29@yahoo.com

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**Abstract**: One ascosporic isolate of *Neurospora* was isolated during surveys of filamentous fungi of *Citrus* and grapevine plantations in Assiut area, Egypt. The isolate was examined for its macroscopic and microscopic features and identified as *Neurospora tetrasperma.* This species is being recorded here for the first time from Egypt.

**Key words**: *Neurospora tetrasperma*, *Citrus* plantation, Mycobiota, Egypt

## Introduction

The generic name *Neurospora* was introduced by Shear and Dodge (1927) for four species characterized by dark ascospores, with a grooved surface with longitudinal ribs. *Gelasinospora* was proposed by Dowding (1933) to accommodate two species with ascospores similar to those of *Neurospora*, but with a pitted wall. Thereafter, many species of *Neurospora* and *Gelasinospora*, so far 12 species of *Neurospora* (Tai 1935, Gochenaur & Backus 1962, Nelson *et al*. 1964, Frederick *et al*. 1969, Mahoney *et al*. 1969, von Arx 1981, Perkins & Raju 1986, Krug & Khan 1991, Dettman *et al.* 2001) and 37 of *Gelasinospora* (refer to Garcia *et al*. 2004) have been described. Different members of these genera use one of three different mating strategies: heterothallism, homothallism, or pseudohomothallism. Recent studies on both *Neurospora* and *Gelasinospora* based on DNA sequences of four nuclear genes (Dettman *et al*. 2001), and ultrastructural and 28S rDNA sequence data of numerous strains of most of the species of both genera (Garcia *et al*. 2004) revealed that the ornamentation pattern of the epispore is not a very informative character for establishing phylogenetic relationships at the infrageneric level in these two genera and confirm the hypothesis that there are not enough criteria to distinguish them from each other. The names *Neurospora* and *Gelasinospora* are synonymized and so far 49 species of *Neurospora* have been now recognized in the genus (Garcia *et al*. 2004) and the generic diagnosis was expanded to include those with ascospores broadly fusiform, ellipsoidal, or nearly spherical, 1-celled, hyaline to yellowish brown or olive-brown, becoming dark and opaque at maturity, ascosporic wall with longitudinal ribs or pitted, occasionally nearly smooth. Anamorphs are known in only a relatively small number of species, belonging to *Chrysonilia* Arx 1981 (Garcia *et al*. 2004). However, investigations on multiple-gene sequences and morphology concluded that although *Gelasinospora* and *Neurospora* are closely related, there is insufficient evidence to place currently accepted *Gelasinospora* and *Neurospora* species into the same genus (Cai *et al.* 2006).

In Egypt, of this genus only the anamorphic stage of *Neurospora crassa* (*Chrysonilia crassa*) is being reported. It has been reported from animal and bird pens materials (Moharram *et al.* 1987), soybean meal (Moharram *et al*. 1989), combine harvestor sorghum dust (Abdel-Hafez *et al*. 1990), caraway and cumin seeds (Abdel-Mallek *et al.* 1990), the air of Bahariya Oasis, Western Desert (Ismail *et al*. 2002). Reference strains of this species are deposited in the Culture Collection of Assiut University Mycological Centre (refer to the Catalogue of Culture Collection of AUMC 2010).

## *Neurospora tetrasperma* C. L. Shear & B. O. Dodge 1927

*Neurospora erythraea* C. L. Shear & B. O. Dodge 1927

*Neurospora toroi* F. L. Tai 1935

**Anamorph: *Chrysonilia tetrasperma* (C. L. Shear & B. O. Dodge) Arx 1981**

*Monilia tetrasperma* Shear & Dodge 1927

**Colony characteristics**

Colonies on PSA and OA filling the plates (9 cm) within 3 days at 25 ºC; ascomata produced abundantly after 7 days, dark brown to black, with scanty aerial hyphae and dark reverse particularly below the ascomata. Colonies on CYA filling the plate within 3 days, after 7 days, dark but intermixed with orange colour (the conidial stage) especially at the periphery of the plate, reverse is dark below the ascomata (but lighter than that on PSA and OA). On MEA after 7 days, colonies and reverse orange, with very little numbers of ascomata compared to those on PSA, OA and CYA (Fig. 1).

**Teleomorph**

Homothallic, ascomata ostiolate, 200-370 µm in diam, beak length 58-110 µm, beak width 80-88 µm. Asci 4-spored, 107-131x15-17 µm. Ascospores uniseriate or somewhat overlapping, olivaceous at first, becoming dark brown to black with maturity, ellipsoidal or elongate, 33.6-36x14-16 µm, wall with 16–22 longitudinal, sometimes branched ribs and ornate epispore, with one germ pore at each end (Fig. 2).

**Anamorph**

Produced abundantly on MEA and CYA, conidia subglobose to obovoid, smooth, 8-12(–16) x4-9 µm, orange in mass.

This species was first described by Shear and Dodge (1927) from an isolate contributed by Dr Gerald Stahel from unknown substratum. It is quite different from the other species producing 4-spored asci (*N. tetraspora* Garcia *et al.* 2004 = *Gelasinospora tetrasperma* Dowding 1933) by the ascospores dimensions (21–33x12–20 µm), and the inwardly projecting circular or slightly irregular pits of the ascospore wall (Garcia *et al*. 2004).

This is the first record of this species in Egypt. It is known by only one isolate and reference strain has been deposited in the Culture Collection of Assiut University Mycological Centre (AUMC 5089 recovered from the air of *Citrus* plantation in April 2008).

This species is of worldwide distribution. It has been frequently isolated from burnt vegetation and soil (Shear & Dodge 1927, Tai 1935, Perkins *et al.* 1976, Perkins & Turner 1988, Turner *et al.* 2001, Garcia *et al*. 2004 and Jacobson *et al*. 2004), and alkaline soil (Eliades *et al*. 2006).

Key to the two species of *Neurospora* so far recorded in Egypt (both with ascospores with longitudinal striations):

- Homothallic, asci 4-spored, ascospores 24–40 x 14–22 µm, conidia 8-12(-16)x4-9 µm.....*N. tetrasperma*
- Heterothallic, asci 8-spored, ascospores 27–36x14–16 µm; conidia 6–8 µm diam ……..……*N. crassa*

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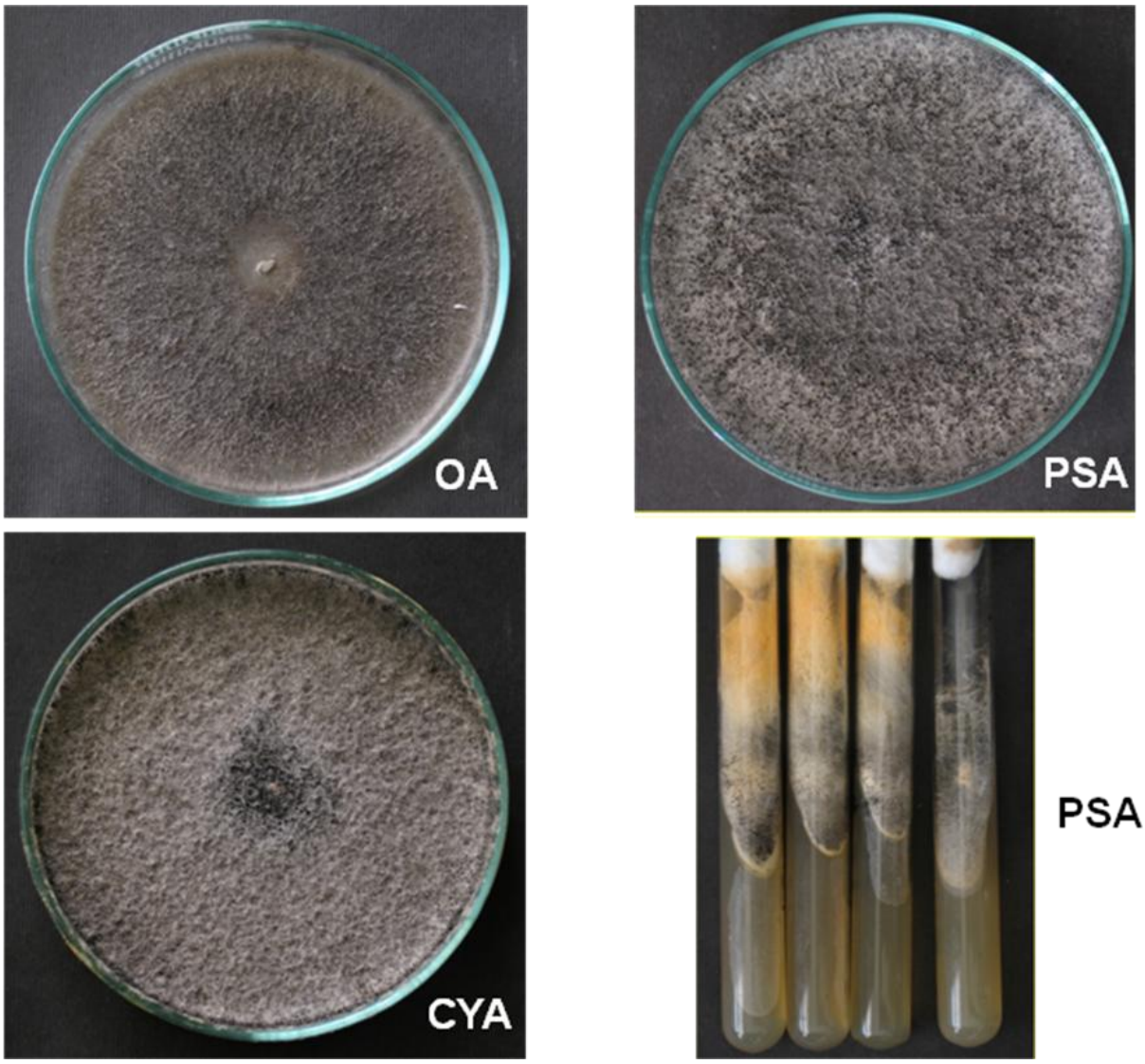


Figure 1: 15-day old cultures of *Neurospora tetrasperma* AUMC 5089 on Oat agar (OA), Czapek yeast agar (CYA), potato sucrose agar (PSA) plates and PSA slants.

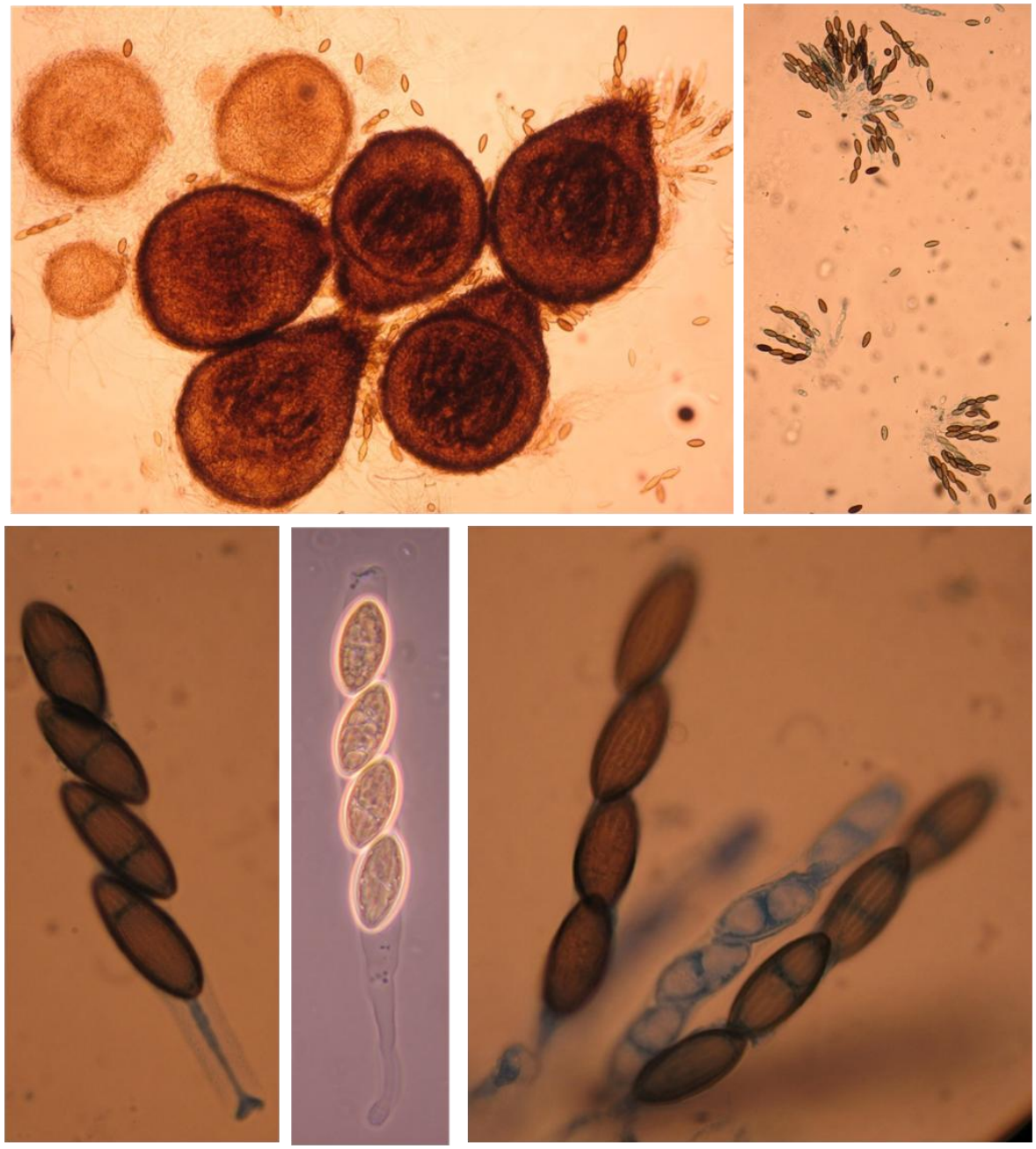

Figure 2: Ascomata, 4-spored asci and longitudinally striated ascospores of *Neurospora tetrasperma* AUMC 5089.