

## First report of *Gymnosprangium cornutum* stem rust on *Juniper phoenicia* in Libya

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### Abstract

During field visit of many forests regions for survey of conifers diseases in Al-Jabal Al-Akhdar, Libya, a serious stem rust disease was discovered on *Juniperus phoenicia* trees. The disease described and illustrated here in detail.

**Key words:** Conifers, Juniper, stem disease, rust fungi, Libya

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### Introduction

*Juniperus phoenicia* L., Arabic: araâr and English: Phoenician juniper (Fig. 1). The Phoenician juniper is a polymorphous species appearing in two areas, one littoral and another continental: along the North Africa coast, it goes from the upper arid to the humid in the hot and mild variants. On sea dunes being stabilised, the Phoenician juniper forms an unbroken line in association with *Juniperus oxycedrus* subsp. *Macrocarpa* in the interior, it goes from the lower arid to the upper semi-arid in the mild to fresh variants, where it is in association with several climax essences (holm oak, cork oak, kermes oak, Barbary thuya, Aleppo pine) that belong to different climax variants. The province of Al-Jabal Al-Akhdar (Fig 2) has a temperate climate that favours the growth of a rich and diversified natural flora and timber trees, and the extensive cultivation of field, fruit and horticultural crops. Juniper is the most important a evergreen plant trees that grows in this area (Keith, 1965; Final Report, 2003).



Fig. 1: *Juniper phoenicia*



Fig.2: Map of Libya and location of Juniper trees growth

It's an tree that has been used for food, craft purposes and in traditional medicine for centuries. The part used is leaves and berry-like fruits that contain oligosaccharides, catechic tannins, biflavonoids, leucanthocyanes, alcohol acids and terpenic alcohol that have antimicrobial and antifungal properties (Nasri, et al., 2011). Juniper is subject to stem diseases caused by rust fungi. The mycelium of these fungi is perennial in the bark or wood of that host, resulting in various malformations such as galls, burls, or swelling, cankers, and switches-brooms (FAO, 2009). Although rusts are widely represented in this area, no specific surveys have been carried out in the past decades. This prompted the senior author to undertake an investigation to this effect, the results of which are reported in the present paper.

### Material and Methods

Dieback and declines of uncertain cause affect junipers were observed in several localities in the region. Infected portions were photographed under stereomicroscope at magnification of 25-50x, and spores were mounted in lactophenol. Semi-permanent slides were prepared by cementing cover slips with nail lacquer (Dade & Gunnell, 1969). The slides showing rust stages were observed under a microscope (Olympus CX21) and microphotographed by Sony DSC-S700. Illustrations were also made by using Camera Sony (Cyber-shot Japan). Spore dimensions were taken by an Ocular micrometer (zeiss eye piece screw micrometer).

### Description of Symptoms

Symptoms of dieback and decline was observed on the trees. The rust causes slight fusiform swellings on twigs and small branches of the juniper (Fig. 3). The fusiform swellings deterrent and rough (4,5). The swelling was grow rapidly in length, spreading for considerable distances up and down the stem before it is girdled and killed.

### Description of Species

Spermogonia, Aecia and Uredinia unknown. Telia develop only on the twigs and smaller branches, and there is no external sign of the fungus on the larger branches and trunk. Depending upon where infection occurs, trees die slowly from the bottom of the crown upward, from the top done, or both up and down from the middle. The Telia are appear on the branches as patches that forming white blisters (Fig. 5). These blisters rupture at the top to disclose the pustules (Fig. 6). The telia in this species was appear in scattered or in groups and confluent (Fig.7). It was pushed out through the bark as flattened pustules and do not appear on leaves. The pustules are chocolate-brown color and different in shape and size, ranging about 0.2-0.5 cm (Fig. 8). Teliospores pale-brown, mostly two-celled, ellipsoid to oblong,  $34-67 \times 13-28 \mu\text{m}$  in size, slightly constricted in the middle, with deposit beak at top cell and a conical deposit at the base (Fig. 9). Based on the morphological characters in figures, the organ-ism was identified as *Gymnosporangium cornutum* Arth. It is reported from Africa, Asia, Europe, and North America (Kern 1972).



Fig. 3: Symptoms of disease on branches. Fig. 4 and 5: Different shapes of fusiform swellings on twigs.

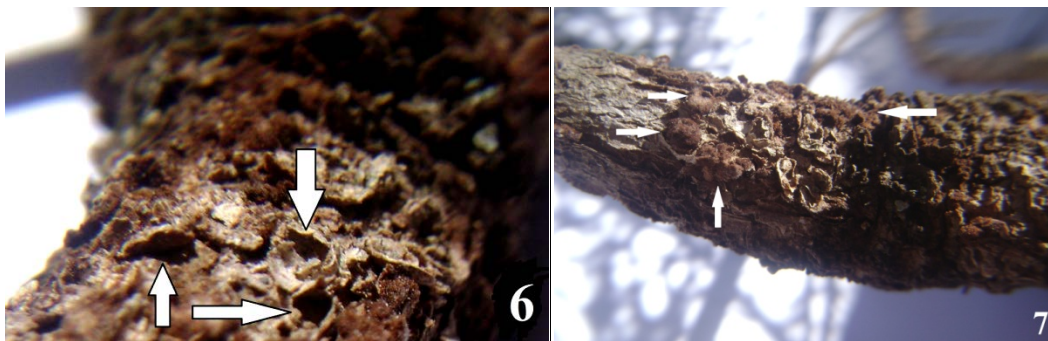


Fig. 6: A few of the mature telia have ruptured (at arrow).

Fig. 7: Telia in scattered or in groups and confluent (at arrow).

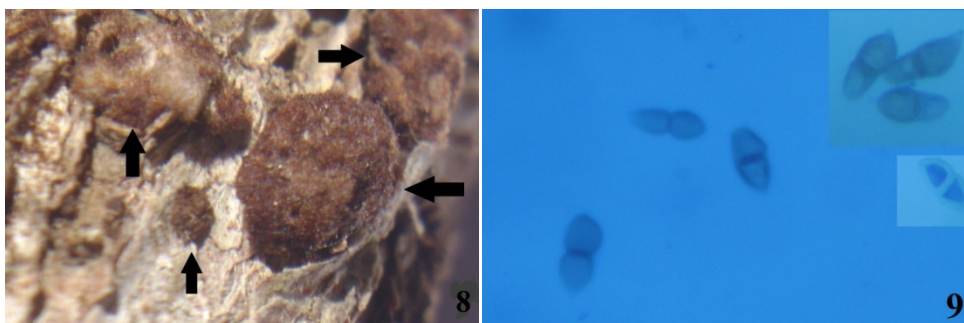


Fig. 8: Different shapes and sizes of telia on twig. Fig. 9: Teliospores.

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