

New Quinoa Disease (*Chenopodium Quinoa* Willd.) in Tropicalized and not Tropicalized Quinoa Crops in the Tropical Region of Cochabamba, Bolivia

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ABSTRACT

Quinoa (*Chenopodium quinoa* Willd.) is traditionally cultivated in the Bolivia and Peru Andean region. In Bolivia, it is mainly cultivated in the southern, central and northern altiplano highlands (3800 masl). In recent years, research has been done on the tropicalization of this crop to introduce it to tropical regions of Bolivia for export purposes. In 2024, quinoa was planted in a location in the tropical Chapare (250 masl) Cochabamba region, a tropicalized variety (UAGRM-FINE) and another non-tropicalized variety from the Altiplano. In the fruiting and grain filling phenological phase, a disease occurred affecting both varieties, although with a higher incidence in the nontropicalized variety. After laboratory observation in a lactophenol solution, its morphological characteristics as conidiophore and conidia are coincident with the *Periconia* sp description. In conclusion, it is a new quinoa disease that affects tropicalized and non-tropicalized varieties in Bolivia.

Keywords: New Disease, Disease Intensity, Tropicalized Variety

Quinoa (*Chenopodium quinoa* Willd.) is native to the Bolivian and Peruvian Andean region. In Bolivia, it is traditionally cultivated in the Altiplano highlands (average 3,800 meters above sea level): south (Garci-Mendoza locality influence area), center (Patacamaya locality influence area) and north (Viacha locality influence area). Its cultivation has increased from twenty thousand (1983-84) to one hundred and twenty thousand hectares (2020-2021) with 500 kg/ha average yield [1]. In recent years, quinoa is beginning to be cultivated in tropical regions of Bolivia, such as Santa Cruz region near the Amazon (430 meters above sea level and 1,300 mm) and the Andean Amazon region known as Chapare (250 meters above sea level and 3,500-4,000 mm), department of Cochabamba, due to its potential cultivation for export. In 2024, in Chimoré locality, Chapare, quinoa was grown in winter sowing -April to August, 10 to 18 oC and high humidity as predominant climate-, a tropicalized variety (UAGRM-FINE), from Santa Cruz-, and a non-tropicalized variety (ATHUSAYA) from the altiplano highlands, from the Challapata locality (3850 masl), department of Oruro. In August, at the grain filling phenological stage, in both varieties,

a foliar disease occurred affecting the panicle basal part. (Figure. 1a). Diseased samples were taken for laboratory analysis by mounting them in a lactophenol solution and observing them under a microscope. The disease was isolate in the tropicalized variety (UAGRM-FINE) and up to 70% incidence in the non-tropicalized variety. The typical symptom was dry rot at the stem level of the panicle, light brown color, whitish wool abundant formation, similar to downy mildew, with the presence small blackish points -fungus heads- (Figure. 2b), leaving the hang panicle contaminated with saprobes fungi. (Figure. 1a,c). Under microscope observation, recorded conidiophores macronematous long, hyaline, mostly with stipe and globose to irregular head form, looking like round-headed pins, robust base, Branch present, stipe straight and flexuous, smooth (Figure. 1d,e), conidiogenous cells poliblastic, discrete on stipe, determinate, spherical or subspherical (Figure. 1f). Conidia catenate, chains branched, simple, spherical or subspherical, occasionally elipsoidal, pale to dark brown, echinulate, aseptate initially hyaline, becoming golden brown at maturity, thick-walled, verruculose. (Figure. 1e,f). According to Ellis is described as *Periconia* sp. *Periconia* species have been reported as saprobes, endophytes, plant and human pathogens, distributed

widely in terrestrial habitats and rarely in aquatic and marine environments and, *Periconia endophytica* was isolated from the healthy leaves of *Wurfbainia villosa*, while *P. yangjiangensis* and *P. wurfbainiae* were obtained from the dead stems of the same host [2]. Currently, only traditional quinoa diseases registered for the Bolivian Altiplano have been reported, such as *Peronospora* downy mildew, *Ascochyta* and *Cladosporium* leaf spots, and parasitic nematodes [3,4]. In conclusion, *Periconia* sp., apparently new specie, is a new quinoa disease cultivated in tropical regions of Bolivia [5].

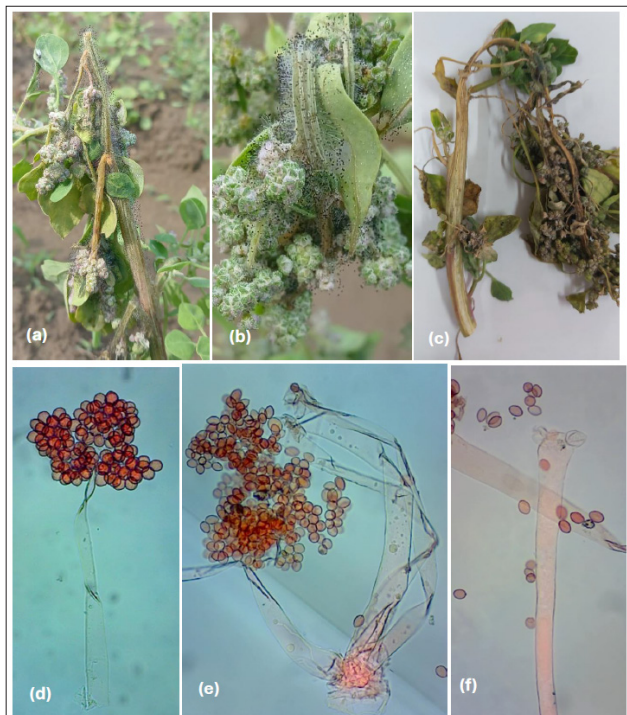


Figure 1: *Periconia* sp. (a): Dry rot in the basal part of the panicle; (b): Abundant woolliness on stem affected; (c) ; (d): Conidia grouped in globose to irregular dark brown head and hyaline conidiophore (100x); (e): conidiophore and conidia (100x); (f): polyblastic cell (100x).

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