

A Report of Grey Mold Disease on Grapes Caused By *Botrytis cinerea* in Gilgit-Baltistan, Pakistan

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Gilgit-Baltistan (GB) is the north most administrative region of Pakistan (Weightman, 2005). GB has a cool, dry climate and is rich in animal and plant diversity. Fruits such as apricots, apples, grapes, pears and pomegranate are widely grown. The economy of the people is largely dependent on these horticultural crops (Ahmad Bakhtiar, 2003). Among the horticultural crops the grapes are the most popular fruit of GB (Agricorner, 2012). There are numerous locally grown grape varieties of specific characteristics in GB (Anonymous, 2013). Recently the diseases of grapes have posed problems for the viticulturists in GB Pakistan.

The higher amount of rainfall in the recent years which is associated with the climate change favor the development of diseases. Among the diseases the grey mold fungus *Botrytis cinerea* Pers. Fr. [teleomorph *Botryotinia fuckeliana* (de Bary) Whetzel]. a necrotrophic fungus causes severe losses in the ripening grapes (Williamson., *et al.* 2007; Oliver., *et al.* 2010) in GB However the other areas of Pakistan such as Lahore where approximately 40% of grape fruits were reported to infect with grey mold or Botrytis bunch rot disease (Javed., *et al.* 2017).

The fungus (*Botrytis cinerea*) is asexual form of fungus because the sexual form (Teleomorph; *Botryotinia fuckeliana*) is rarely observed (Van Kan, 2006). Gray mold fungus affect grape berries, resulting in yield losses and reduced fruit quality (Yu, 1997). The grapes infected with the fungus are more often damaged to such an extent that they are useless for consumption. In the recent years frequent spring rains have caused moist conditions which cause shoot blight of grapes prior to fruit ripening. Soft brown tissues develop on the infected plant parts. The leaf axils are also infected which cause the shoots to wilt or collapse.

The infected berries become brownish or reddish depending on cultivars. As wind speed is very low and temperature is moderate therefore epidermal cracks appear in which fungal product mycelium and spores are formed. As a result the whole bunch of grapes exhibited characteristic gray and velvety appearance. The fungus produce hard resistant structures called sclerotia particularly on the diseased berries which are felled on the ground or left hanging on the vines (Williamson., *et al.* 2017). During rain or irrigation these hard resistant structures germinate and produce spores which are moved by air currents or splashing rain. If free water and moderate temperature is available infection by this spores is real.

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During spring flowers can become infected through the stigma and through a scar on the tip of pedicel. The fungus then begin to dormant and waiting for late in the season when the sugar concentration increases in the infected berry. The fungus then start to infection and rapidly spread throughout the berries. When the infection increases the berries split and become crack, thus pathogen transfer and spread to adjoining berries. If the relative humidity is very high and free moisture is present and temperature is moderate the late infections become more severe [Figure 1].

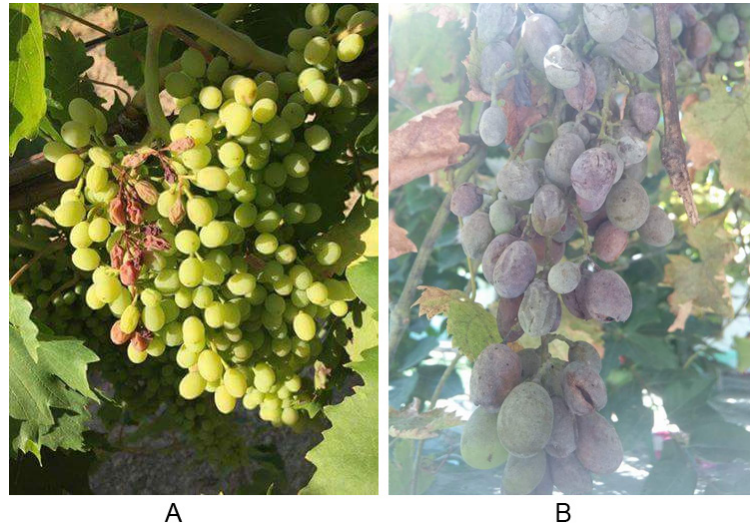


Figure 1: Grey mold infection on the grape fruits of Gilgit Baltistan (GB)
A. early stage B. ripening stage.

The berries are also infected when insets and birds are causing injuries. When the fruit begin to ripe there is much water and nutrients available consequently fungus can proliferate well and cause severe infection. This disease can be managed by development of resistant cultivars, cultural practices and as well environmentally friendly bio control agents (Donmez, *et al.* 2011).

Though it is difficult to manage this disease because it has diversity in modes of attacks, broad host range and can survive as mycelia, conidia and sclerotia for extended periods of time. The precipitation patterns of the region are unreliable and erratic and therefore the timely management of grape diseases have become difficult. There are no resistant cultivars available to minimize the economic losses faced by farmers due to gray mold disease. The cost of fungicides are so high as well as not ecofriendly. Moreover the lack of storage and marketing facilities for grapes also inflict heavy post-harvest losses to grapes.

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