

## Crown Gall Disease of Apricots in Nomal and Nagar Valleys of Gilgit-Baltistan (GB), Pakistan

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**Received:** March 3, 2018; **Published:** March 20, 2018

Volume 2 Issue 2 March 2018

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### Introduction

Gilgit-Baltistan (Formerly known as Northern Area) is mountainous region of Pakistan (Hinman, 2011). The total area of Gilgit Baltistan (GB) is 72,971 km<sup>2</sup> (28,174 sq mi). GB having fifty highest peaks and three world's longest glaciers is one of the spectacular regions of the world. It is linked by Karakorum highway (KKH) with Xinjiang region of China to the east, Khyber Pakhtunkhwa to the west, a highway with Azad Kashmir to the south and to its south Wakhan Corridor of Afghanistan is located (Weightman 2005).

Gilgit Baltistan (GB) is divided into three divisions i.e. Gilgit, Baltistan and Diamer which, in turn, divided into Districts i.e. Gilgit (Gilgit, Ghizer, Hunza and Nagar), Baltistan (Skardu, Shigar, Kharmang, and Ghanche) and Diamer (Diamer and Astore ) (Pamirtimes 2016). In 2000 majority of GB population was involved in the agricultural sector, but recently services have surpassed agriculture as the principal source of income. Cherry, apricot, apple, peach and grapes are the common fruits. Among the vegetables potato is one of the main source of income of farming community of GB.

Wheat and maize are the major cereal crops. Severe winter, cool spring and hot and dry summer of GB make the area suited for the cultivation of fruits, vegetables and cereals. GB has the most fragile ecosystem and climate change impacts are more drastic and extreme. Recent increase in temperature and heavy rainfall associated with world-wide climate change resulted in the diseases of fruit trees creating food insecurity for the apricot growers of GB. Fruit diseases develop under a well-defined, optimal range of climatic variables such as temperature, rain, relative humidity. The occurrence and severity of any disease depends on the deviation of each climatic variables within the optimal range for disease development (FAO, 2008). Therefore recent heavy rainfalls and high temperature might be favorable and act together in the initiation and development of various bacterial, fungal and viral diseases of fruits in GB. Among the fruits, grapes are severely infected by Grey mold disease caused by *Botrytis cinerea* (Abbas., *et al.* 2017).

Apricot (*Prunus armeniaca* L.) is an economically important fruit of Gilgit-Baltistan (GB). According to a publish report of local Newspaper (The Nation) GB is the largest apricot producing region of Pakistan (The Nation, 2017). Apricots covers 6170 hectares that gives 60305 tons of production annually in the GB. Nagar, Hunza and Nomal valleys are famous for Apricot production (Ahmad., *et al.* 2008).

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**Citation:** Aqleem Abbas., *et al.* "Crown Gall Disease of Apricots in Nomal and Nagar Valleys of Gilgit-Baltistan (GB), Pakistan". *Clinical Biotechnology and Microbiology* 2.2 (2018): 311-313.

The varieties of apricot grown in Baltistan Division of GB are Halmand, Wahphochuli, Lonakpochuli, Sherakarpochuli Shakhanda, Margulam, Karpochuli, Ambah, Staachuli, Khochuli and Brochuli. Similarly the varieties of apricot grown in Gilgit Division of GB are Dugli, Neeli, Bedeiri, Chalpachu, Loli, Frugui, Khormagui, Alishah Kakas.

Recently crown gall disease caused by *Agrobacterium tumefaciens* poses a serious threat to the apricots production in GB. In November 2008, crown gall disease was observed on apple apricot and cherry trees in Nagar and Nomal valleys of GB. These fruit trees were investigated from November 2008 to February 2009 to determine the incidence prevalence and severity level of the Crown gall in the District Gilgit and Nagar. Disease incidence and severity of the crown gall were about 99% in cherry and 97 % in apple trees of Nomal valley. Likewise disease incidence and severity of crown gall were 97 % in cherry and 98 % in apples of Nagar valley. Surprisingly no attack of crown gall disease was recorded on apricots of these valleys (Ali, *et al.* 2010).

In spring, 2016 the apricot trees in Nagar and Nomal valleys of GB were observed with crown gall symptoms. Abnormal galls and tumors were observed on the roots and crown regions of the apricot plants. Moreover secondary wood rots were also observed in some of the infected apricot trees. The symptoms observed were similar as described by Ogawa, *et al.* (1995). Moreover for further confirmation there is need to characterize the pathogen morphologically (colony color, colony shape etc.), biochemically (Fatty acid analysis, oxidase and catalase activities etc.) and more importantly through molecular methods (16SDNA based identification etc.). Gall tissues and soil are the main source of crown gall bacteria.

The bacteria can enter into apricot trees through injuries. To our knowledge improper apricot cuttings, grafting and picking with unsterile things and unhygienic methods might have caused injuries and that injuries have become entry point for the pathogen. Recently apricot cuttings have been introduced, therefore it is possible that the crown gall bacteria may have been introduced in GB through this cuttings. The apricot growers of GB need to grow certified and non-infected clean apricot trees. Moreover to prevent the dissemination of crown gall disease to avoid injuries are very important. The disease can also be manage by Biological control agents (BCAs) such as *Agrobacterium radiobacter* strain K84 however BCAs are currently unavailable to apricot growers of GB. Crown gall disease can also be managed by application of antibiotics. In a previous study the most of the *Agrobacterium tumefaciens* strains isolated from the apple and cherry trees of Nagar and Nomal valley were found to resistant against the antibiotics such as Lincomycin, Amoxycillin, Ampicillin and Cloxacillin while Cephadrine, Tetracycline and Dioxycycline (Ali, *et al.* 2010). Moreover these antibiotics have medical and veterinary uses and are not cost effective and environment friendly therefore use of these antibiotics against crown gall disease is not a robust idea. Further research regarding the interaction of pathogen with apricot trees is needed.

## References

1. Ali Hussain, *et al.* "Incidence and Severity of Crown Gall Disease of Cherry, Apple and Apricot Plants Caused by *Agrobacterium tumefaciens* in Nagar Valley of Gilgit-Baltistan, Pakistan". *Pakistan Journal of Nutrition* 9.6 (2010): 577-581.
2. Abbas A. "A Report of Grey Mold Disease on Grapes Caused By *Botrytis cinerea* in Gilgit-Baltistan, Pakistan". *Clinical Biotechnology and Microbiology* 1.3 (2017): 117-119.
3. Ahmad S., *et al.* "Cherry marketing system in Gilgit district northern areas of Pakistan". *Sarhad Journal of Agriculture* 24.4 (2008).
4. FAO. "Climate-related Transboundary pests and diseases". *Climate change, energy and food* (2008).
5. Hinman, Bonnie (15 September 2011), *We Visit Pakistan*, Mitchell Lane Publishers, Inc., p. 41, ISBN 978-1-61228-103-2
6. Nation, 2017. <https://nation.com.pk/13-Mar-2017/gb-is-country-s-largest-apricot-producing-region>
7. Ogawa JM., *et al.* "Compendium of Stone Fruit Diseases". *Department of Plant Pathology* (1995).
8. Pamir times. "Mehdi Shah announces formation of 2 Divisions, 2 sub-divisions and 4 Tehsils in Gilgit – Baltistan – PAMIR TIMES – Voices of the Mountain Communities". [Pamirtimes.net](http://Pamirtimes.net). Retrieved (2016).
9. Weightman Barbara A. *Dragons and Tigers: A Geography of South, East, and Southeast Asia* (2<sup>nd</sup> Ed.) John Wiley & Sons (2005): 193.

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