

# Effect of polyethylene bunch cover on fungal diseases control of banana (*Musa acuminata* L.) in Iran

M. Amani\* and G. Avagyan

- 1- Student PhD at the National Agrarian University of Armenian
- 2- Chair of Plant protection at the National Agrarian University of Armenian

**Corresponding author:** M. Amani

**ABSTRACT:** Banana (*Musa acuminata* L.), is one of the most important fruit crops in South-East of Iran. In this study, the effects of bunch cover were studied as experiment in form of Randomized complete block design with 2 treatments and 4 replications (20 bunches with cover and 20 bunches without cover) on banana trees (*M. acuminata* L.) C.V. "Dwarf Cavendish" in Konarac region of Sistan & Bluchestan province, during 2009-2011. The results showed that the above-mentioned factors have significant effects on fungal diseases disorder damage, yield at 1% level probability. Finally, using polyethylene bag covering is recommended treatments for decreasing of Pitting, Tip end rot, Cigar end rot, Brown spot, Diamond spot diseases damage and improving the quality characters of fruits.

**Keywords:** Banana, Polyethylene Covering, Iran, Konarac, Diseases

## INTRODUCTION

Banana (*Musa acuminata* L.), is one of the most important, food crops of the world and South-East of Iran regions. It is grown in gardens and smallholdings in some 120 countries, mainly in the tropics and subtropics (Amani 2004 & 2007; Jones 2000). The total land under cultivation of banana in Iran is about 5420 hectares with an annual production of 131,990 tones and average production of 35 tons per hectare (FAO. 2012), which is mainly cultivated in Chabahar, Konarac, Iranshar, Sarbaz, Jask and Minab regions. Protection of young bunches of fruits with polyethylene bag covering is one of the measures use in the producer countries (Amani, 2005).

The use of polyethylene bunch covers is widespread throughout the commercial banana growing regions of the world. They are also commonly used to protect export market intended plantain fruit during development. The practice is regarded as essential to improve the market quality and yield of the fruit. Bunch covers provide protection to the fruit surface against pathogens, wind damage, leaf and petiole scarring, dust, light hail, sunburn, bird feeding, and handling damage during harvest and transport. A significant reduction in peel surface damage from insect pests may be obtained by covering the plantain or banana bunch shortly after pollination. In addition, the incidence of postharvest anthracnose disease has been shown to be significantly less on fruit from sleeved bunches. The net effect of bunch cover use is better fruit quality and increased marketable yield.

Commercially available bunch covers generally are colored white or translucent blue. The plastic may also be colored silver to reflect heat. The recommended type of bunch cover varies according to environmental conditions.

In southern Queensland and New South Wales, the insulation of the cover is essential for enhancing fruit quality during the cooler months. Bunch covers of various colors and conditions have been extensively used in banana growing countries with the aim of improving yield and quality (Stover and Simmonds, 1987; Robinson, 1996). Improved quality includes appealing skin color, reduced sunburn, reduced fruit splitting, and increased

finger length and bunch weight among others (Robinson, 1996; Amarante ., 2002). Bunch covers have also been used to protect bunches from low temperatures, especially in temperate countries (Gowen, 1995; Robinson, 1996). This is due to enhanced physiological and metabolic activities provided by the microclimate created by bagging (Johns and Scott, 1989a). However, the effect of fruit bagging, especially in the tropics, on size, maturity, skin color among other postharvest parameters has been contradictory, which may reflect differences in the type of bag used, fruit age at bagging, fruit and cultivar response, prevailing climatic conditions and conditions of holding fruit after harvest (Johns and Scott, 1989a; Amarante ., 2002; Narayana ., 2004).

In Panama, Banana thrips (*Chaetanaphothrips orchidii*) has controlled with bunch covers in 2-3 weeks after formation of fruits (Stover, 1972). In addition bunches were protected against the pests and diseases such as thrips, beetles, Pitting, Anthracnose, Tip end rot, Cigar end rot, Brown spot and Diamond spot (Amani, 2005). The used of polyethylene bags on bunches, was also advocated as a control measure of diseases in Cameroon, India and Palestine (Jones, 2000). The objective of this study therefore was to investigate the effect of bunch covering on fungal diseases and postharvest quality of tissue cultured banana fruits using cv. Dwarf Cavendish as the test variety. In this study, the effects of bunch covers on fungal diseases control of banana were performed as experiment in form of randomized complete block design with 2 treatments and 4 replications on banana C.V. "Dwarf Cavendish" in Konarac region, during 2009- 2011. This is the first report of the effects of bunch cover on diseases control of banana (*M. acuminata*) in Iran.

## MATERIALS AND METHODS

In order to the effects of bunch cover on diseases control of banana were studied as experiment in form of randomized complete block design with 2 treatments and 4 replications (20 bunches with cover and 20 bunches without cover) on banana C.V. "Dwarf Cavendish" in Konarac region, during 2009-2011. Total Agricultural activations consist of fertilization; irrigation and weeds control were realized. In this study sampling has preformed in various stages from banana bunches. The samples of banana fruits, which showed symptoms of disease damages such as Pitting, Tip end rot, Cigar end rot, Brown spot, and Diamond spot were collected from banana bunches. Then samples were transferred to laboratory. In laboratory, pathogens were isolated from samples and identified.

### **Covering:**

After selection of garden, polyethylene bags were used of young bunches in 2-3 weeks age in 2 treatments and 4 replications in 1600 m<sup>2</sup> (40×40). In each plot, 10 plants with 4×4m were selected. Covering of bunches were preformed with polyethylene bag (70×100<sup>cm</sup>) on banana bunches.

### **Sampling:**

In order to detect of infection incidence of diseases in bunches with cover and bunch without cover treatments, sampling has preformed from banana bunches.

## RESULTS AND DISCUSSION

According of historical cultivation and production of banana in Iran, this is the first report of the effect of bunch cover with polyethylene bags on banana diseases control. In this regard, protection of young bunches with polyethylene bag covering were taken 2-3 weeks after formation of fruits (Fig.1). Infection incidence of diseases in two treatments was detected and infection samples studies in laboratory of Chabahar tropical fruits research station.



Figure 1. Protection of young bunches with polyethylene bag

The results showed that the above-mentioned factors have significant effects on diseases disorder damage, yield at 1% level probability. *Pyricularia grisea*, *Musicellium theobromae*, *Cercospora hayi*, *Fusarium moniliforme*, *F. solani* and *F. pallidroseum* were isolated from samples and were identified. Symptoms of Pitting, Tip end rot, Cigar end rot, Brown spot, Diamond spot and Sunburn were observed in without cover treatment (Fig.2, 3). In the end, crop of the each plot were harvested then weight and length of bunches, hands and fingers were measured (Table 1). Finally, using polyethylene cover is recommended treatments for decreasing of diseases damage and improving the quality characters of fruits.

Table 1. Effects of bunch cover on fungal diseases control of Banana & Yield

Treatment	Number of finger in each bunch	Number of hand	Average of hand weight (Kg)			Average of bunch weight (Kg)	Infection of Disease (%)			
			Lower	Middle	Upper		Pitting	Diamond spot	Tip end rot	Cigar end rot
Cover	60	8	5.4	6.5	8.5	20.1	0	0	0	0
Non over	60	8	4.8	6.1	7.6	18.5	8	6	12	20



Figure 2. Symptoms of Cigar end rot (right), Sunburn (between) and healthy (left)



Figure 3. Symptoms of Cigar end rot (right) and healthy (left).

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