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**Original Research Article**

# Impact of Diverse Pollinizers on Flowering, Physical and Yield Parameters of Ambri Apple

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**A B S T R A C T**

The present think about entitled "Compatibility of diverse pollinizers with Ambri apple" was carried out amid the year 2013-2014 at Krishi Vigyan Kendra- Shopian, SKUAST-Kashmir. Eight apple species (Golden spur, Red Gold, G.Del Reinders, Malus floribunda, Golden Hornet, Manchurian, Snow Drift and Maharaji) were utilized as pollinizers for Ambri within the valley, and diverse blossoming and physical parameters were decided. The try was laid in RCBD plan with three replications. Among the distinctive pollinizers the most elevated bloom duration and bloom intensity was recorded with Floribunda. The ponder assist uncovered that most noteworthy fruit set (%) was recorded with Brilliant goad. Greatest fruit estimate, natural product weight and yield was recorded with Golden spur. Most elevated number of seeds (7.0) was recorded with the pollen of Golden Hornet and the fruit shape was long cone shaped. Utilize of the dust of these apples in commercial generation will move forward fruit quality and advance sustainable and strong fruit production.

**Keywords**

Bloom duration, Pollinizer, Compatibility, Flower intensity, Fruit set

## Introduction

The commercial apple, Malus domestica (Borkh), is considered to be self-unfruitful. A pollinizer must be given for these cultivars. Nearly all apple cultivars are either self-incompatible, or semi-compatible, and require cross-pollination to set fruit in attractive quantities (Garratt *et al.*, 2013). For commercial generation, at slightest two cross-compatible cultivars with synchronous blossoming are required in an plantation (Goldway *et al.*, 2013; Garratt *et al.*, 2013). The separate of pollinizer from the most cultivars is an critical thought. Matsumoto *et al.,* (2008) detailed a critical decrease in fruit set with expanding remove between pollinizer and primary cultivars. They recommended pollinizers ought to be planted not more than 10 meters from the cultivars (Matsumoto *et al.*, 2008). Since an financial edit of apples depends on effective cross-pollination, it is vital that a adequately expansive source of compatible pollen be show within the plantation. Genetically apples appear gametophytic self-incompatibility (Thompson and Thompson, 1992) which requires the pollen exchange from another pollinizer assortment to set fruit in attractive amounts. Apple pollen grains are generally expansive and, as a result, wind does not play a critical part in fertilization. Pollen exchange in apples is carried out by a few species of creepy crawlies. Local wild bees, singular bees such as the bumble bee, flies and other species can play a noteworthy portion in fertilization. Honeybees are particularly valuable in fertilization since of their social nature. Since honeybees live in hives containing thousands of people, dust can be exchanged from bee to bee within the hive as well as specifically from flower to bloom within the field.

A few gauges propose that an expansive rate of the dust exchange that takes place from honeybee activity happens within the hive instead of within the plantation. Pollinizer courses of action based on hive exchange of pollen make it basic that high honeybee populaces be accessible each year to achieve the fertilization assignment. Crabapples are by and large overwhelming knickers with inexhaustible dust; a few crabapple species can set fruit on commercial apple cultivars. Pollen-compatible crabapples (i.e. cultivars that can set apple fruit) can be utilized as an elective or extra source of pollen for expansive apple pieces where lacking fertilization was given. This approach can moreover be utilized for single-cultivar plantings or triploid cultivars to maximize generation.

In the event that fertilization is in question, crabapples can be planted as protections to supplement the ordinary fertilization arrangements in an plantation..

## Materials and Methods

The experiment was conducted during 2013-2014 with an objective to find out the compatibility of different apple cultivars with Ambri apple. Full bearing apple cultivars uniform in age were selected for experimentation in apple orchard at Krishi Vigyan Kendra- Shopian, SKUAST-Kashmir. The experiment was laid in RCBD design with three replications.

The blossom of Ambri apples were used as female parents while as the Golden spur, Red Gold, G.Del Reinders, Malus floribunda, Golden Hornet, Manchurian, Snow Drift and Maharaji was used as pollen parents. The different fruit parameters of Ambri apple was tested with pollinizers were determined. The fruit of each treatment were harvested at optimum maturity and were analyzed for different parameters. The weight of fruits was calculated by weighing the representative sample of fruits on an electric balance, averaged and recorded. Fruit size was determined by calculating the length and breadth of 10 samples with the help of Vernier caliper and calculating L/D ratios and expressed as centimeters (cm). Seed content in each fruit was assessed by slicing the apples horizontally through the equatorial plane and the number of fully developed seeds were counted. The yield was estimated by multiplying total number of fruits per tree with the average fruit weight of ten randomly selected fruits. The yield was expressed in kilograms per tree. Fruit dropping percentage was determined using the following formula:

$$\text{Fruit drop (\%)} = \frac{\text{Total No. of fruitlets} - \text{No. of fruits}}{\text{Total No. of fruitlets}} \times 100$$

Fruit set (%) was calculated as the ratio of total number of fruits per spur to the total number of flowers per spur as follows:

$$\text{Percentage of fruit set} = \frac{\text{Total no. of fruits per spur}}{\text{Total no. of flowers per spur}}$$

Bloom density or number of flowers/shoot was recorded as the number of floral buds per linear meter of marked shoots counted on four random branches from all four sides of the tree as a measure of flower density in the month of April. The duration of flowering was recorded as number of days from the date of opening of first flower to the date of opening of last flower in each accession was determined. Fruit shape is determined as the ratio between fruit length and diameter, and represents one of the most important traits of apple fruit external quality.

## Results and Discussion

The data on the effect of different pollinizers on bloom duration, flower intensity, fruit set, fruit size, fruit weight, yield, number of seeds and shape is presented in Table 1. Maximum flower intensity (172.32) and bloom duration (20.50) was recorded with Floribunda. While as lowest flower intensity (96.76) was recorded with Maharaji and lowest bloom duration (14.50) was recorded with Red Gold.

The problem of unproductive growing space has led to an interest in ornamental crab apples as pollinators for the major apple cultivars (Church and Williams, 1). These trees are small, and tend to flower profusely over a long period. The data further revealed that highest fruit size, fruit weight (128.5g), fruit set (25.3%) and yield (30.5kg/tree) was recorded with Golden spur pollinizer. The results are in agreement with Kumar *et al.*, 2005, who reported that Star spur Golden Delicious recorded maximum fruit set 45% and 35%, maximum fruit weight and largest fruits in Co-op 12 during both seasons and thus can be used for increasing the productivity of apple. Lowest fruit drop percentage (3.02%) was recorded with Maharaji while as highest fruit drop percentage (4.65%) was recorded with Golden Horznet. Maximum number of seeds (7.0) was recorded with Golden Hornet while as lowest number of seeds (5.8) was recorded with Golden spur and fruit shape was long conical. Poor fruit set directly affect apple productivity in India.

Srivastava *et al.,* 2013 reported that when Ambri was crossed with Maharaji apple 55.16% and 55.00% fruit set was recorded during the seasons. Thus the recent trend in apple plantation is shifting to spur type cultivars like Golden spur, Winter Banana, Granspur etc. for sustainable fruit production (Gautam and Sharma, 2000). The number and distribution of seeds within a developing apple affects its shape and weight (Keulemans *et al.,* 1996). Kron and Husband (2006) reported that by increasing the diversity of compatible pollen enhanced seed number and reduced seed abortion is observed resulting in increased number of fruits.

**Table.1** Impact of diverse pollinizers on flowering, physical and yield parameters of Ambri apple

| Pollinizer | Bloom duration | Flower intensity | Fruit set (%) | Fruit drop (%) | Frt size (cm) Length | Breadth | Fruitt Weight (g) | Yield/tree | No. of seeds/fruit | Fruit Shape |
|---|---|---|---|---|---|---|---|---|---|---|
| Golden spur | 16.00 | 150.25 | 25.3 | 4.5 | 69.4 | 64.2 | 128.5 | 30.72 | 5.8 | Long conical |
| Red Gold | 14.50 | 123.12 | 22.25 | 3.7 | 65.23 | 62.5 | 125.3 | 26.34 | 6.4 | Long conical |
| G.Del Reinders | 15.20 | 110.2 | 19.2 | 4.3 | 66.7 | 61.23 | 128.43 | 25.98 | 6.8 | Long conical |
| Manchurain | 17.50 | 145.56 | 24.20 | 3.25 | 62.24 | 64.78 | 112.78 | 20.34 | 6.5 | Round |
| Golden Hornet | 16.50 | 157.20 | 17.6 | 4.65 | 60.20 | 61.57 | 110.56 | 24.54 | 7.0 | Round |
| Floribunda | 20.50 | 172.32 | 21.25 | 3.78 | 58.45 | 60.27 | 115.21 | 21.42 | 6.9 | Round |
| Snow Drift | 16.00 | 134.56 | 17.23 | 4.00 | 60.54 | 61.42 | 109.32 | 19.25 | 6.0 | Round |
| Maharaji | 17.5 | 96.76 | 23.52 | 3.02 | 68.67 | 66.83 | 123.65 | 27.76 | 6.3 | Oblong |
| CD>0.05 | **1.03** | **3.21** | **1.98** | **0.96** | **1.43** | **1.5** | **3.78** | **2.78** | **0.75** | |

**Fig.1** *$T_1$:Golden spur, $T_2$: Red Gold, T3: Golden Delicious Reinders$T_4$: Manchurian $T_5$:Golden Hornet, $T_6$: Floribunda, $T_7$: Snow Drift, $T_8$: Maharaji, $T_9$: Ambri*

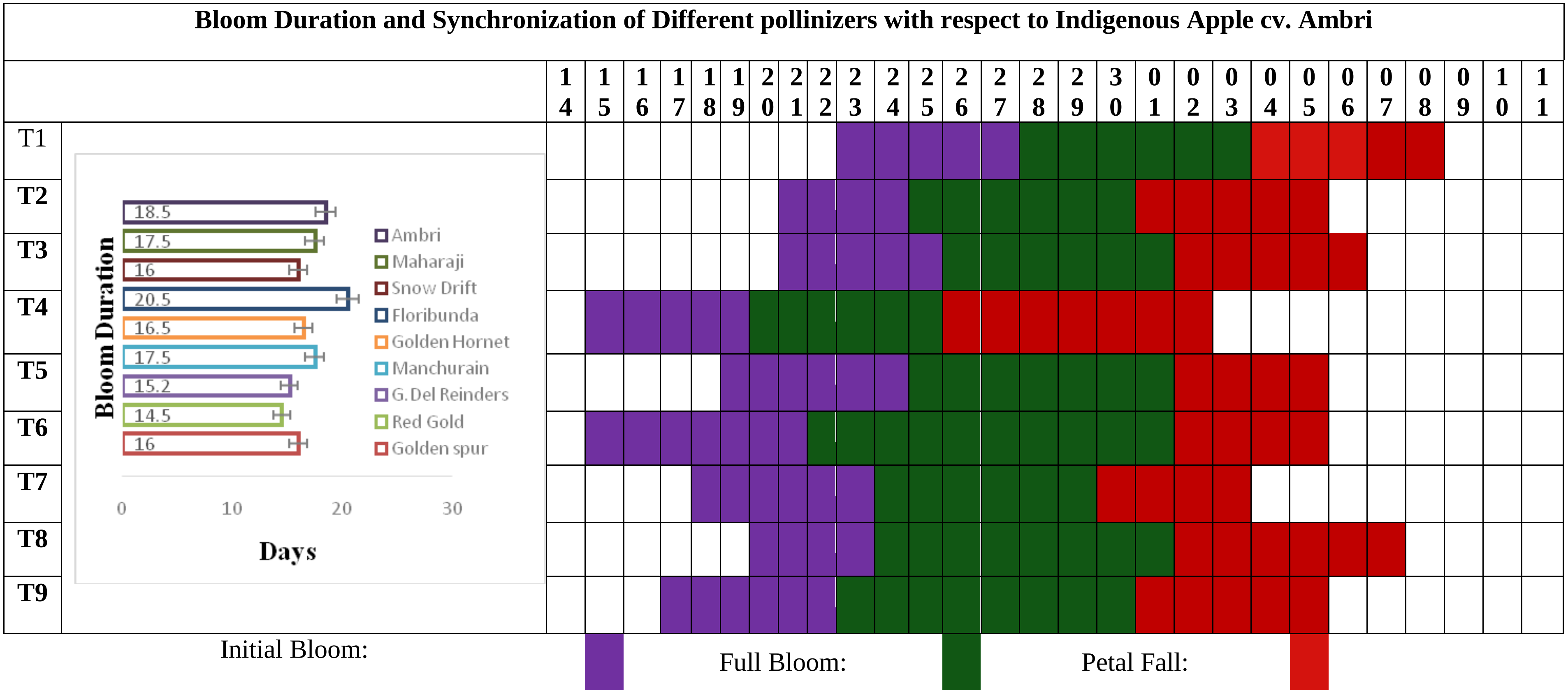
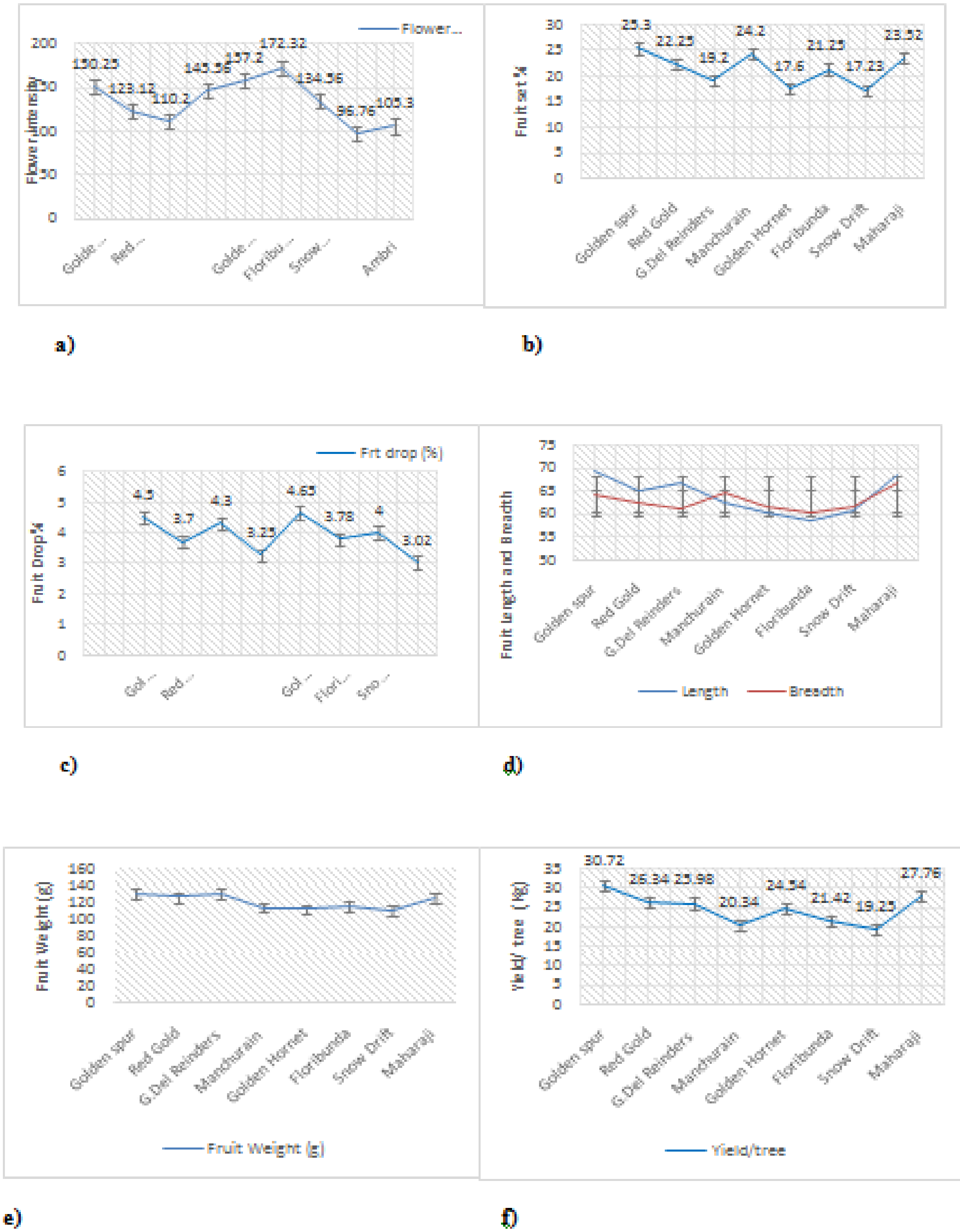


**Fig.2**


Flower...
150.25
123.12
110.2
145.56
157.2
172.32
134.56
96.76
105.3
Fruit set %
25.3
22.25
19.2
24.2
17.6
21.25
17.23
23.52
Golden spur
Red Gold
G.Del Reinders
Manchurain
Golden Hornet
Floribunda
Snow Drift
Maharaji
a)
b)
Frt drop (%)
Fruit Drop%
4.5
3.7
4.3
3.25
4.65
3.78
4
3.02
Fruit length and Breadth
Length
Breadth
c)
d)
Fruit Weight (g)
Yield/ tree (Kg)
30.72
26.34
25.98
20.34
24.54
21.42
19.25
27.76
Yield/tree
e)
f)

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