Table 1. Reaction of strawberry germplasm to foliar diseases

Category	Reaction	No. of entry	Genotypes
0	Immune	Nil	–
1	R	8	Tore, Jatog special, Shimla special, No-7, No-5, Dilpasand, N R Round Red, V L
2	MR	15	Addie, Blackmore, Belrubi, Brighton, Catskill, Chandler, Confictura, Selva, Douglas, Elastha, Enta, Fairfax, Fen, Shastha, Phenomenal
3	MS	3	Seascape, Elesenta, North West
4	S	1	Florida

Based on PDI, the germplasm was categorized into different reaction classes: 0=immune (I), no leaf spots; 1=resistant (R), 0.1-5% leaf area infected; 2=moderately resistant (MR), 5.1-10% leaf area infected; 3=moderately susceptible (MS), 10.1-25% leaf area infected; 4=susceptible, 25.1-50% leaf area infected; and 5=highly susceptible, >50% leaf area infected.

The data presented in Table 1 revealed that none of the genotypes were found immune to foliar diseases, however, eight genotypes namely Tore, Jatog special, Shimla special, No-7, No-5, Dilpasand, N R Round Red and V.L. showed resistant reaction. Fifteen cultivars viz., Addie, Blackmore, Belrubi, Brighton, Catskill, Chandler, Confictura, Selva, Douglas, Elastha, Etna, Fairfax, Fern, Shastha and Phenomenal exhibited moderate reactions, while the remaining genotypes were either susceptible or highly susceptible. The germplasm observed to be resistant would be utilized in breeding programme to develop foliar disease resistant varieties with desirable horticultural traits.

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Evaluation of Exotic Guava Accessions for Pectin and Tannin Content and their Correlation to Fruit Fly Damage

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Key Words: Exotic Collections, Fruit Fly, Guava, Pectin, Tannin

Guava, basically an exotic crop is one of the important fruit crops of India and is commercially cultivated throughout the country. The fruits are rich source of Vitamin 'C' and pectin and are much relished when they are mature green. Owing to its high nutritive value and good flavour, guava fruit has got great potentiality for processing. The fruits are made into a number of processed products and among them nectar, jam, jelly and juice have got good market. Several studies were carried out on the physico-chemical properties of guava. Murali and Verma (1989) evaluated guava varieties for nectar. According to Singh and Dhawan (1983), Lucknow 49 is the best variety for jelly making. As the quality of the end product depends upon the quality of the raw materials, varietal evaluation for key quality parameters and selection is very important. Keeping this in view , the present study was undertaken to evaluate the exotic accessions of guava for pectin and tannin content which is a pre requisite for processing and also their relation with varietal susceptibility to fruitfly, *Bactrocera dorsalis* (Hendel).

Materials and Methods

The present investigation was carried out at IIHR, Bangalore during 2001-2003. The materials used for the study consisted of seven exotic accessions viz., EC 147039, 9-35 EC 147036, 7-12 EC 147036, EC 147037, 7-39 EC 147034, G-6, EC 162904 and two popular Indian cultivars viz., Nasik and Smooth green. Fully matured fruits of slight colour turning stage were used for the study. Randomized complete block design with three replications was adopted, consisting of five fruits per replication. The pectin content was estimated as per methods of Bitter and Muir (1962) and tannin by A.O.A.C (1984). The data were statistically analyzed and treatment means were compared. The fruit fly damage was calculated based on the number of fruits infested , taken out of 50 fruits randomly harvested from each variety.

Results and Discussion

The perusal of data presented in Table1 shows that there was a significant variability in pectin and tannin content and susceptibility to *B. dorsalis*, among different guava accessions. In general all the exotic accessions possessed attractive red flesh with firm texture which is a desirable trait for processing. As regards pectin, it ranged from 0.95% in EC 147037 to 1.57% in G-6 which is on par with the pectin (1.47%) recorded in EC 162904. Varieties rich in pectin are best suited for jelly making (Singh and Dhawan 1983). Hence, the varieties G-6 and EC 162904 could be exploited for jelly preparation. According to Dhingra *et al.* (1983) highest number of jelly unit was obtained from Sardar and Apple colour.

Among the accessions evaluated for tannin, the accession 7-12 EC 147036 recorded significantly lowest tannin (89.6 mg/100g). The next best accessions with low tannin content are 9-35 EC 147036, EC 147037and 7-39 EC 147034. The variability present in the pectin and tannin content is may be due to the differences in cultivar, location and cultural practices. Though, tannins play an important role in imparting astringency to the final product, it affects the fruit processing by giving coloration to the end product. Thus, the accessions viz., 7-12 EC 147036, EC 147036, EC 147037 and 7-39 EC 147034 with low tannin could be exploited in the processing industries. The demand for red and pink varieties are more in Europe market which are required for tropical fruit mixes (Anon1999). According to Salmah and Sulhaila (1987) the tannin level was high in immature fruits and remained at a constant low level after 10 weeks of fruit set. Esteves *et al* (1984) reported that the total phenols varied from 333 to 545 mg/100g at 100 days after full bloom in different guava cultivars.

Two collections viz., EC 147037 and EC 147039 were found to be least susceptible (< 10 % fruit damage) while 9-35 EC 147036 and EC 162904 were moderately susceptible to fruit fly damage. All the exotic collections were significantly superior to smooth green. The biochemical constituents of fruits like TSS, phenols etc., are reported to influence fruit fly infestation (Arora *et al.*, 2000). In the present study, a significant negative correlation (r = –0.724) was observed between tannin content and fruit fly damage. However, pectins were found to play no role in influencing the fruit fly preference to a variety as there was no significant correlation. As high pectin content is a desirable trait, this can be exploited without the fear of attracting more fruit fly infestation.

Table 1. Pectin and Tannin content of exotic guava accessions and their relation to fruit fly damage

S.No.	Accession	Pectin (%)	Tannin (mg/100g)	Fruit fly damage (%)
1	7-39 EC 147034	1.18	123.7	27.66
2	7-12 EC 147036	1.28	89.6	29.66
3	9-35 EC 147036	1.08	92.3	15.67
4	EC 147037	0.95	115.2	1.67
5	EC 147039	1.29	181.2	6.67
6	EC 162904	1.47	208.47	18.33
7	G-6	1.57	183.15	20.33
8	Nasik	1.22	98.8	28.83
9	Smooth green	1.14	114.81	49.00

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Performance of Indigenous and Exotic Semi-Soft Pear Strains and Varieties under Sub-Tropics

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Key Words: Asian Pear Varieties, Exotic, Indigenous, Semi-Soft Pear Strains

Pear is the most commonly grown fruit in the temperate region of India. Oriental pear is mainly grown in sub-tropics and lower hills of north-west India. The varieties like *Patharnakh* and *Gola* are commonly grown, which are high yielding, but are poor in quality, hence yet not accepted as table varieties. Although, soft pear varieties like Le Conte and Baggugosha are also grown, but on very limited areas, due to their shy and alternate bearing nature. Therefore, lot of efforts have been made for collected/introduced semi-soft pear strains and some Asian pear varieties from indigenous and exotic sources and evaluated for their suitability under low chilling conditions of Punjab.

The present study was conducted at Punjab Agricultural University, Ludhiana, during 2003 and 2004. The 13-year old trees of semi-soft pear strains code named strain I, II, III, IV, VII, VIII, IX, X, XI, XII, XIV, XV, XVI and Asian pear varieties viz. Yali, Shinseiki, Hosui, Nijisseiki and Kosui, were evaluated for their yield potential and fruit quality traits. The plants grafted on *Pyrus pashia* (Kainth) rootstock, were planted at 6.5 x 6.5 m apart. The number of fruits were counted one month before the harvesting of fruits. A sample of twenty fruits were collected randomly for recording the fruit weight and other quality parameters as per the standard procedures.

The results obtained during the studies are presented in Table 1. The data shows that the highest number of fruits per tree were harvested from strain II (685.2), followed by strain VII (665.2) and strain I (639.3), all these strains were statistically at par with each other. The strain XII produced the minimum (321.7) number of fruits. Among the Asian varieties, the Yali recorded highest number of fruits (672.2), closely followed by Hosiu (672.1) and minimum number was recorded in Shinseiki. Variation in fruit number was also observed in different semi-soft pear strains (Singh, 2002) and in Asian pear varieties (Singh, 1998). The yield per tree was highest (97.3 kg) in strain II, followed by strain VIII (91.8 kg), which was statistically at par with each other. The strain XII was found to be the lowest (44.4 kg) yielder. The soft pear varieties of Asian origin followed the same pattern as regards fruit number per tree. The highest yield of 87.4 kg was recorded in Yali, while lowest of 37.2 kg in Shinseiki. Likewise, Rathore (1982), Gautam *et al.* (1995) and Nath and Rai (2000) reported that different pear cultivars varied in yield under different agro-climatic conditions.

A significant variation was recorded in various quality parameters among all the semi-soft pear strains and Asian pear varieties. The average fruit weight was recorded highest (178 g) in strain XV and lowest (132 g) in strain VII. The variable fruit weight have been reported in pear cultivars and clones (Rathore, 1982, Sandhu *et al.*, 1994 and Nath and Rai (2000). Significantly higher (130 g) fruit weight was recorded in yali as compared to other Asian pear varieties, which were at par in their fruit weight. Griggs and Iwakiri (1977) also observed bigger fruits in Yali than others. The juice percentage varied from 51.0 in strain VII to 57.8 in strain VIII. All the Asian varieties had high percentage of juice content, maximum being (74.4) in Yali, followed by 74.3 in Nijisseiki and minimum (59.3) in Shinseiki. Singh (1998) also observed highest juice percentage in Yali.

The maximum (14.4%) TSS was recorded in strain XVI, followed by 14.0% in starin XV and minimum (12.90%) in strain XII. Among the soft pear varieties,