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Characteristic Features of Different *Malus baccata* Ecotypes

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Abstract: 7 different types *of malus baccata* which appeared promising in preliminary studies on the basis of their being dwarf and graft compatible with Golden Delicious, a cv. of apple, have been described with respect to salient botanical and horticultural characters. In order to keep the identity of M*alus baccat*a types till they get the status of a variety or species, place of collection has been added after the botanical name. Seven different types of *Malus baccata* and one *Malus s*pecies were collected from different regions and their botanical and horticultural characters studied. On the basis of horticultural characters studied in the nursery, it was found that *Malus baccata* (shillong) and *Malus baccata* (Khrot) were as semi dwarf easy to propagate through stooling and with good graft compatibility with apple. The grafts also made small linear growth, thereby indicating that the plants will remain semi dwarf. As such these two types have potential as a dwarfing rootstock for apple. *Malus baccata* (Srinagar) also deserves attention as a semi dwarfing to semi vigorous rootstock.

1. *MALUS BACCATA VAR.* HIMALAICA

Though only two species of *Malus*, Viz., *Malus sikkimensis* and *Malus baccata* var.himalaica have been reported from the Himalayans (Hooker,1879; Anonymous,1962), there are quite a few distinct types *of Malus baccata* which are growing wild. It was collected from Japan, Keylong and Nalda (Himachal Pradesh) at an altitude of 3000m ASL where it is locally known as 'LIZO' and also from Maphlong (Meghalaya) at an altitude of 1303m. The plants are small and hardy. Bark of young shoots brownish with raised round and oval lenticels. Leaves simple, dark green, with an average length and breadth of 7cm and 2.3 cm respectively, elliptic, base obtuse, apex acute, margins serrate. Phyllotaxy alternate, venation reticulate pinnate. Petiole 1.5 cm long and finely channeled. The lateral axillary shoots modify in to thorn after one year. Flowering in March –April. Fruit ripens in October, 1cm in diameter, avoid, red when ripe, stylar end pressed, base pointed; borne in clusters of 4 to 5 on 3cm long pedicels

Like collar rot (*Phytophthora cactorum*) root rot (*Dematophthora necatrix*) and wooly aphis (*Eriosoma lanigarum*). Considering its partial resistance to diseases and pests, which are spreading in the apple growing areas, and also the advantage of its being dwarf, it is a promising rootstock. Chilling requirement increased with the increase in the number of stars. To know the chilling requirement of different species, tip cuttings containing 4-5 buds were collected at 15 days interval and planted in an environment chamber at 25 °C+1 °C, 70% RH and 20 hours light cycle of 1200 lux. The sample was assumed to have met the chilling requirement with bud break (Randhawa and Kishore, 1984). Stomate estimate was made by adopting the technique of Beakbane and Majumder(1975).

2. *MALUS BACATA* SHILLONG

It was collected from Shillong (Meghalaya) at an altitude of 1300m ASL. It is locally known as 'Soh-Shur' (Kanji Lal *et al.* 1934). A small tree

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branched from near the ground. Bark of young branches brownish with few raised, rounded and oval lenticels , puberulous. Leaves simple with an average length and breadth of 5.60cm and 2.75 cm respectively, elliptic, base obtuse to truncate, apex acute, margins serrulate. Phyllotaxy alternate; venation reticulate pinnate, leaves dark green midrib and veins villous on both the ventral and dorsal sides. Petiole 1cm long wooly and with a fine furrow. Stipules present. The lateral axillary shoots modify into a thorn after one year. Flowering in April,Fruit ripens in October, 0.75cm in diameter, globose and depressed at the apex, scarlet red when ripe; pedicel 3.7cm long. It is easy to propagate through stooling. It has given very good graft success with apple. The grafts made medium to semi-vigorous linear growth in a year which is an indication that the grafted plants may remain medium vigorous. Its chilling requirement is less than that of M-9 and MM-106 rootstocks. Resistant to wooly aphid. Considering the fact that it is easy to propagate clonally, it is dwarfing, has given good graft success with apple cv. Golden delicious, it should be subjected to extensive studies as a dwarfing rootstock for apples cvs.

3. *MALUS BACCATA* (KHROT)

Collected from Khrot (Himachal Pradesh)at an altitude of 2000m ASL. Where it is locally known as 'Ban Phall'. The Local inhabitants use its seedlings as rootstock for apple. Plants under wild conditions are semi dwarf and spreading. Bark of young branches brownish with few raised round lenticels, puberulous. Leaves simple with an average length and breadth of 10 cm and 4.7 cm respectively, elliptic, base truncate, apex acute margins double serrate. Phyllotaxy alternate, Venation reticulate pinnate, leaves dark green glabrous on ventral side, midrib and veins villous on dorsal side. PPetiole 1cm long, reddish, finely grooved, villous. Flowering in March; fruit ripens in October, yellow with red strips on ripening, globose and flat at both ends, diameter 2.6 cm, prominently ridged in to 5 sections; pedicel 4.1 cm long. It has been categorized to be as dwarfing as M-9 rootstock by stomatal density technique. It is east to propagate through stooling and has given good percentage of graft success with apple cv. Golden delicious.

4. *MALUS BACCATA* (GIABUNG)

Collected from Giabung (Himachal Pradesh) at an altitude of 2900m ASL. It is locally known as 'Leed'. A small tree with thin branches. The bark of young branches is light brown with few rounded and oval lenticels, villous. Leaves simple with an average length and breadth of 10.1cm and 3.3 cm respectively, ovate, base obtuse, apex acute, margins double serrate. Phyllotaxy alternate, venation reticulate pinnate, leaves dark green, glabrous on ventral side, dorsal side puberulous; petiole 1.5 cm long, finely channeled; stipules persistent. Flowers appear in April on slender pedicels of an average length of 3.7 cm in groups of 4 to 6. Fruit ripens in November, 0.8 cm in diameter, scarlet red when ripe, globose and depressed at the apex. It gives fairly good success when propagated through stooling. Its chilling requirement is less than that of M-9 and MM-106 rootstocks. Information regarding its susceptibility to root rot (*Dematophthora necatrix*), collar rot (*Phytophthora cactorum*) and wooly aphis (*Eriosoma lanigarum*) is lacking.

5. *MALUS BACCATA* (DHAK)

Collected from Dhak (himachal Pradesh) at an altitude of 2060m ASL where it is locally known as 'Bambtu'. Plants tall, spreading, bark of young branches brownish, smooth, with few raised round and oval lenticels. Leaves simple with an average length and breadth of 9.2cm and 4cm respectively, ovate, margins double serrate, base obtuse, apex acute, villous on dorsal side and glabrous on the ventral side.Phyllotaxy alternate, venation reticulate pinnate. Midrib and veins more distinct on dorsal side; stipules persistent. Petiole 2cm long thin, villous and finelly channeled. The lateral axillary shoots modify into thorns after one year. Flowering in March. Fruit ripens in October, reddish with yellow back ground, globose, slightly pressed at both ends diameter 3.1cm; pedicel 1.7cm long. Grafts of apple cv. Golden Delicious on this rootstock are semi vigorous. It is difficult to propagate through stooling without the help of plant growth regulators and etiolation. Its

chilling requirement is less than that of M-9 and MM-106 rootstocks.

6. *MALUS BACCATA*. (SRINAGAR)

Collected from Srinagar (J&K) at an altitude of 1390m ASL. It is used as a rootstock for apple in Kashmir valley. Plants semi dwarf and compact. Bark of young shoots brownish, smooth with few raised round and oval lenticels, villous. Leaves simple with an average length and breadth of 9cm and 4.5cm respectively, elliptic, margins serrate, base obtuse, apex acute, dorsal side villous ventral side glabrous. Phyllotaxy alternate, venation reticulate pinnate, midrib and veins more distinct on the ventral side. Petiole 3cm long thin ,villous and finelly channeled. Flowering in April. Fruit ripens in September ,elliptic, with 5 ridges, 1.7 cm in diameter, 4 to 5 in a bunch yellow coloured; pedicel 2.5cm long ; calyx persistent.

7. *MALUS BACCATA* (ROHRU)

It was collected from Rohru place in Shimla district (Himachal Pradesh) at an altitude of 2100m ASL. A small tree branched near the ground , hardy and bushy. Bark of young branches with few raised round and oval lenticels. Young shoots villous. Leaves simple with an average length and breadth of 4.5 cm and 2.75cm respectively. Leaf ovate,margins double serrate, base truncate, apex acute, glabrous on ventral side, midrib on dorsal side puberulous. Phyllotaxy alternate, venation pinnate, midrib and veins more distinct on dorsal side; stipules linear.Petiole 1.8 cm long, thin and finely channeled. It is difficult to propagate through stooling. Its chilling requirement is much less than that of M-9 and MM-106 rootstocks.

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