

CHARACTERISTIC FEATURES OF *PYRUS* SPECIES

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Abstract: Pears (*Pyrus* spp.) with chromosome No. $2n=2x=34$ is a major fruit of the Rosaceae family after apple, which is originated from Europe and Asia. Its cultivation started more than 3000 years ago. Based on geographical distribution the pears can be divided into two main groups, European and Asian pears. European pears are located in Europe, North Africa, Asia Minor, Iran, Central Asia, and Afghanistan, with the most important species *Pyrus communis*. Oriental pears such as *P. serotina* synonym *P. pyrifolia* distributed in Japan have originated from Eastern Asia. Currently, pears are commercially cultivated in more than 50 temperate regions of the world. The genus *Pyrus* has at least 22 known species, all of which are native to Asia, Europe, and the northern areas of the United States with more than 5,000 varieties. The primary center of origin of pear is China and Asia minor to the Middle East in the Caucasus mountains. Secondary center is in Central Asia. In word scenario, pears are mainly cultivated in China, USA, Argentina, Italy Turkey, Spain, India, South Africa, Japan, Belgium, etc. Pear is grown under a wide variety of climatic regimes, ranging from cold dry temperate hilly conditions to warm humid subtropical conditions on the plains of northern India. In India Pears are widely cultivated in Punjab, Himachal Pradesh, Jammu and Kashmir, Uttar Pradesh, Uttarkhand, etc. In temperate fruits, genus *pyrus* occupies an important position. Variability of the European and American species of *pyrus* viz; *pyrus jacquimontiana*, *pyrus polycarpa*, *pyrus pashia*, *pyrus pashia* var. *kumaoni* and *pyrus pyrifolia* were collected and evaluated for botanical and horticultural traits. In addition to these species, it will be desirable to survey and collect some other *pyrus* species such as *pyrus griffithii*, *pyrus khasiana* and *pyrus thomsoni* which have been reported by Hooker (1879).

CHARACTERISTIC FEATURES

Pyrus communis L.

It is a deciduous small to medium-sized tree to 10 m tall (normally 3-5 m in cultivation), with a pyramidally shaped crown. The conical erect trunk bears small, reddish-brown, narrow-angled branches. The grey-brown bark has shallow furrows and flat-topped scaly ridges. Leaves alternate, simple, elliptic/ovate with a finely serrated margin, obtuse tips, 2.5-10 cm long and 3-5 cm wide, shiny green above, paler and dull below, glabrous. The petioles are stipulate and the buds are involute, with imbricate scales. Flower corymbose inflorescences, 5-7.5 cm wide, containing 5-7 showy white, 2.5-3.5 cm wide flowers, borne from terminal, mixed buds of short spurs, appearing before or with the leaves.

The spurs are very short and lateral branches. The ovary is epigynous, or inferior, with the 5-carpellate ovary embedded in receptacle tissue, containing up to 10 ovules (2 per carpel); peduncle thin, 2.5-5 cm long. Fruit a pyriform (pear-shaped) pome with persistent or deciduous calyx, 4- 12 cm long, greenish colored, dry and gritty. Seed blackish, 8.4 by 4.8 mm, each with a thin layer of endosperm.

Pyrus pashia

It is known as 'Kainth' in Himachal Pradesh and; 'Sohjhur' in Meghalaya. It was collected from Shimla at an elevation of 1980 m ASL and Shillong at 1300m ASL. It grows wild all over Himalayas between 700m to 2000m ASL. According to Bailey (1953), it originated in the Himalayan region. Plants are found in groups

as well as solitary. Fruits are edible but of very poor quality. Plants vigorous and grow as tall as 15m. Bark of the trunk dark brown, rough and scaly; branches thin, upright, having few raised round or oval lenticels. Young shoots wooly and brown. Leaves simple, trilobed when young, ovate to elliptic, apex acuminate, base obtuse, margins serrulate; stipules deciduous. Young leaves are pinkish and wooly on dorsal side while mature leaves become dark green and glabrous. Phyllotaxy alternate, venation reticulate pinnate having hairy midrib on both sides. The lateral axillary shoots modify in to a thorn after one year. Flowering in the first week of March. White flowers are borne on spurs in short wooly corymbs, petal 5. Fruits ripen during second week of October and their average length and breadth is 2cm and 2.2 cm respectively. Fruits symmetrical, roundish and hang well on maturity. Skin thin, dull, russet with numerous white raised dots; flesh with abundance of grit cells; seeds small, plump, light brown, 5 to 10 per fruit. It is used as a rootstock for pear (Hayes, 1944; Srivastava, 1966). Plants of pear cv. Bartlett grafted on this rootstock remained smaller than those on *pyrus pashia* var. *kumaonii* and *pyrus pyrifolia*). Even by stomatal density technique, it has been found less vigorous as compared to other *pyrus* species. According to Randhawa and Kishore (1981), graft union on *pyrus pashia* was also complete. Shoot cutting of *pyrus pashia* are difficult to root even with blanching, base splitting and IBA treatments. Propagation through stooling, however, gives good percentage of success. Root cutting of 15 cm length with 1.2 cm girth gave up to 91 percent success without any special treatment (Randhawa and Kishore, 1983). Even with air layering, 71.42 percent success was obtained. *Pyrus pashia* is susceptible to powdery mildew caused by *Podosphaera leucotricha* (Ram and Randhawa, 1979). It is also susceptible to fire blight (*Erwinia amylovora*) under field conditions (Hayes, 1944). It is also highly susceptible to collar rot (Randhawa and Ram, 1976).

Pyrus pashia* Ham. Var. *kumaonii

It was collected from Shimla and Chubatia at an elevation of 1980m and 1550m ASL. In Himachal

Pradesh, it is known as 'Shiara' and 'Jarainth'. It is used as a rootstock for pear in Himachal Pradesh and Kumaon (Srivastava et al., 1977) Plants bear profusely and the fruits which are of poor quality are consumed fresh. Plants more vigorous than *pyrus pashia* and grow as tall as 17m. Even by stomatal density technique it has been found more vigorous than *pyrus pashia* and *pyrus jacquimontiana*. Bark rough, scaly, dark brown, splits, branchlets medium thick, drooping, internodes long. Leaves simple, ovate, medium thick with an average length and breadth of 8cm and 5cm respectively, apex acuminate, base truncate and margins serrulated. Petiole 5cm long. Phyllotaxy alternate, venation reticulate pinnate, prominent midrib and deep green veins which are more distinct on ventral surface; stipules linear, deciduous. Flowering in the first week of March. White flowers numbering 8 to 10 are borne on spurs in short glabrous corymbs. Fruits ripen in the first week of October and hang well on maturity. Fruits are generally 4cm long and 4.1cm broad, roundish oblate, skin thick, rough, brownish or russet with numerous white raised dots. Flesh grey, coarse with grit cells in abundance, quality poor but superior to *pyrus pashia*. Seeds dark brown, 6 to 7 per fruit. Ten year old grafts of pear cv. Bartlett on this rootstock were vigorous than those on *pyrus pashia*. It is easy to propagate through air layering and stooling. Plants are resistant to powdery mildew caused by *podosphaera leucotricha* (Ram and Randhawa, 1979). It is however, susceptible to fire blight (*Erwinia amylovora*) under field conditions.

Pyrus serotina* Rehd. Syn. *Pyrus sinensis

It is found growing wild in many parts of the Himalayas and the Khasi Hills of Meghalaya between an altitude of 788m to 1970m. In Himachal Pradesh, its vernacular name is Nakh while in Meghalaya it is known as 'Naspati'. It was collected from Shimla at an altitude of 1980m ASL. It grows vigorously and attain a height of 20m. Even by stomatal density technique it has been found more vigorous than *pyrus pashia* and *pyrus jacquimontiana*. Branchlets medium thick with long internodes and length and breadth of 9.5cm and 5.5 cm respectively,

elliptic to ovate, apex acuminate, base truncate, margins serrulate, venation reticulate pinnate, midrib prominent, veins more distinct on ventral surface; petiole 5cm long; stipules deciduous. Flowering after 25th February around Shimla. White flowers numbering 7-8 are borne on spurs in short corymbs. Fruit ripens in August and hangs well on maturity. Average length and breadth of the fruit is 5.3cm and 6.3cm, respectively. Skin thick, slightly rough, greenish yellow with numerous conspicuous large russetted dots. Fresh white, firm, coarse, crisp, semi juicy, sweet aromatic and having very fine grit cells which are more in number and large in size around the core. Fruits have good keeping quality. Seeds plump and vary from 5 to 10 per fruit. It is used as a rootstock for pear in India. Grafts of pear cv. Bartlett on this rootstock were more vigorous than on *pyrus pashia*. It is difficult to clonally propagate it through shoot cuttings, even with the help of IBA treatment of 2500ppm to 15000ppm. Through air layering it gave a success of 52.95 percent without any treatment. Even through stooling the percentage of success was not good. According to Ram and Randhawa (1979), it is resistant to powdery mildew (*podosphaera leucotricha*). Incidence of fire blight caused by *Erwinia amylovora* is also less under field conditions (Hayes, 1944). It has also shown resistance to collar rot (Randhawa and Ram, 1976)

Pyrus jacquimontiana

It was collected from Kochli and Powari (Himachal Pradesh) at an altitude of 1538m and 3500m ASL respectively. It is locally known as 'Besar' and is used as a rootstock for pear. Plants open headed, vigorous and grow as tall as 12m. By stomatal density technique also it has been classified as less vigorous than other species of *pyrus* in collection. The bark of shoots is greenish brown with prominent round lenticels. Leaves simple with an average length and breadth of 8.9cm and 5.5cm respectively, ovate to elliptic, base obtuse to truncate, apex acuminate to acute, margins serrate, mature leaves light green and glabrous; petiole 4 to 6 cm long, thin and finely channeled. Phyllotaxy alternate, venation reticulate pinnate; free lateral stipules. Flowers

not seen. Fruiting corymb branched, more or less bearing at the end of branches. Fruit ripen in the third week of october and their average length and breadth is 3.2cm and 2.9 cm respectively. Fruits round to oblong grayish, coarse with grit cells; core closed; calyx persistent; seeds small plumpy, light brown, 6 to 9 per fruit. It is resistant to powdery mildew caused by *podosphaera leucotricha* (Ram and Randhawa, 1979). Its usefulness as a rootstock for pear is under investigation.

Pyrus polycarpa

Collected from Shillong and also from Sorarim (Meghalaya) at an altitude of 1300 m and 1350m ASL respectively. It is locally known as 'Diengloporam'. Plants were found in groups. Plants vigorous and grow as tall as 22m. By stomatal density technique also, it has been categorized as more vigorous than the other collected species of *pyrus*, though the size of stomata was almost half of the stomata found in other species. Plants upright, young shoots wooly, bark brownish with prominent elongated lenticels. Leaves simple with an average length and breadth of 11.3cm and 5.6cm respectively, elliptic to ovate, apex acuminate, base cuneate, margins serrulate, phyllotaxy alternate, venation reticulate pinnate, mature leaves glabrous; petiole 1.7cm in length, slender and finely channeled. Flowering in the month of March-April, flowers 8 to 9mm in glabrous and smooth corymbs; petals ovate, glabrous; styles 2, united in the middle glabrous. Fruits globose, borne at the end of small branches of the corymbs, ripen in early December and drop on maturity. Fruits brownish on ripening and have tiny raised lenticels, the average length and breadth of the fruits is 1cm and 1.2cm, respectively. Umbo depressed and covers half to quarter of the fruit diameter with a conical centre which is characteristic of the species; flesh greyish and have grit cells; core closed; calyx deciduous; seeds small. It can be easily propagated through stooling without the help of plant growth regulators. Under field conditions it has been observed to be free from powdery mildew (*podosphaera leucotricha*) and fire blight (*Erwinia amylovora*). Though it is used as a rootstock for pear in Meghalaya, its performance

as a rootstock has not been studied under Shimla conditions.

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