

Horticultural Trees for Live Fencing

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SUMMARY

Live fencing or bio-fencing is an eco-friendly process in which live plants are planted around fields or orchards. Till now few attempts have been made in this aspect and this need to be promoted in future for retrieving maximum benefits. The present article deals with crops suitable for bio-fencing. Among them few are used for bio-fencing and few have potential for use in future for bio-fencing. Beside this, the article also contains essential criteria of bio-fencing, advantages and disadvantages of bio-fencing.

INTRODUCTION

Fencing of an area subject to protection from stray cattle and theft is very crucial in success of crop plantations. Mechanical fencing is invariably a costly affair and requires regular maintenance for which resource poor farmers can't afford. Live fence offers a long lasting and cheap alternative for mechanical fencing. However, for effective fencing tree/shrub should have some minimum desirable characters (Fig. 1).



Figure 1. Desirable characteristics for live fencing plants

Horticultural plants for live fencing

Several fruit plants meet more than three above laid down criteria; hence qualify to become suitable bio-fence material. They can be planted at field boundary at closure spacing in three rows in chess board pattern for effective protection. Mostly, minor fruit tree species can be used for bio-fence which also having high demanding nutritive fruits. Some horticultural plants suitable for bio-fence in sub-tropical areas are listed in Table 1.

Table 1. List of different horticultural species along with fencing characteristics

S.No.	Common name	Botanical name	Fencing characteristics
1	Karonda	<i>Carissa carandas</i>	Thorny, economic, non-browsable and, multiple branches from the base
2	Jungle jalebi	<i>Pithecelobium dulce</i>	Very hardy in nature and thorny type, stout, minor fruit plant timber

3	Bamboo	<i>Bambusa spp.</i>	Brows able but very fast growing, multiple branches from the base, highly remunerative
4	Eastern prickly pear/ Indian fig	<i>Opuntia humifusa</i>	Very hardy, thorny type and non-browsable
5	Prickly pear	<i>Opuntia ficus-indica</i>	Non-browsable and thorny
6	Dragon fruit	<i>Selenicereus undatus</i>	Non-browsable, minor fruit plant and thorny
7	Kaitha/wood apple	<i>Limonia acidissima</i>	Thorny, minor fruit plant, very hardy in growth, useful timber
8	Phalsa	<i>Grewia asiatica</i>	Fast growing, multiple branches from the base, good coppicing twigs used for basket making
9	Custard Apple	<i>Annona squamosa</i>	Non brows able, hardy, minor fruit plant
10	Ber	<i>Zizyphus spp</i>	Thorny, hardy, small timber, and non-browsable
11	Tridhara	<i>Euphorbia antiquorum</i>	Thorny, xerophytic plant and non-browsable
12	Nirgundi	<i>Vitex negundo</i>	Non-browsable, good coppicing ability, very responsive to pruning and other medicinal uses

Karonda: A medium size shrub is non-brows-able and thorny. It provides good ground cover from the base. Fruits are edible and processed for jam, pickle, chutney or candy, jelly, and squash (Peter, 2007; Deepika *et al.*, 2014). Karonda fruits have long shelf life, as such can be transported to distant markets. The species is slow grower in early growth stages but picks up growth after three years of plantation. Plants can be propagated by seed and possess fibrous root system, hence do not invade main crop in field. Due to fibrous root system, 2-3 years old seedling can also be planted with high field establishment. This will help in reducing juvenility in field conditions. Karonda starts bearing fruit after four-five years of age and gives good yield thereafter. If planted on farm boundary as bio-fence, it offers effective protection from 3-4 years till another 30 years. It develops thick hedge which cannot be penetrated by the stray animals. At early stages, however it is prone to trampling by cattle, and browsed by goat, hence it is advisable to plant them along barbed wire fence.

Jungle jalebi: It is a recognized minor fruit plant and very hardy in nature and grows well on poor and marginal soils without much care. It is thorny and tall growing and can be planted at close spacing of 2.0 m. In bio-fence plantation, this plant is encouraged to produce lateral branches to cover interspaces by pinching growing ends. It also gives table fruits which is highly nutritive and liked by people. Its wood can be used for making agricultural implements, fuel wood and other uses. This species can be multiplied by seed. Due to its narrow canopy, it does not interfere with principal crop in the field.

Bamboo: Recently bamboo has been excluded from the list of forest trees to promote farmers to grow bamboo and boost up the bamboo based industries. Some species also used for pickling in North-eastern states of India. Bamboo is fastest growing in nature and grows closely, therefore, constitute excellent live fence material. They can be propagated by rhizome, branch cutting and seed. Although they are browsed, but they escape damage due to fast growth and good culm strength. This species has good potential for live-fence, hence should be promoted among the farmers where crop damage by stray animals are the major issue. The culm harvesting can be started from fifth year onwards. For effective bio-fence bamboo should be planted in a single row spaced 2.0m apart. Bamboo has multiple uses and supports livelihood to the rural household and labourer working in bamboo based industries.

Custard Apple: It is a non-browsable species and important minor fruit plant of subtropics. It is very hardy in nature and grows well with least care on drought prone areas. This can be propagated by seed and grafting. Seed origin plant comes in bearing after 5-6 years while grafted plants start bearing in 4 years. Custard apple can be planted at close spacing of 3-4 m and it also act as deterrent to cattle. In interspaces of custard apple, agave or thorny edible cactus or *Z. numularia* (Jharber) can also be planted to strengthen the live fence.

Hina/Mehnadi: Being thorny, fast growing and non-browsable, hina is an important horticultural crop for hedging. It forms dense green wall in field which cannot be easily penetrated by animals. The species responds well to pruning and can be maintained at desired height. It is propagated by cuttings or seeds. Even non-rooted cuttings can be planted in three rows spaced 25 cm apart during active monsoon season. Its leaves are widely used for colouring human hair, hence in great demand in the market. Pruned material can be used as fuelwood.

Edible Cactus: It introduced late as fruit crop in India. Cactus fruits are delicious and sweet in taste with 14-15° brix TSS. The fruits have areoles on the surface. Both thorny as well as thorn less varieties are available for cultivation in India. Thornless varieties are primarily used as scarcity fodder, the thorny ones can be planted as live fence besides fruit production. It is propagated by cladodes which is stem modification and green in colour. Its growth is poor in waterlogging, rocky, sloppy and degraded lands.

Dragon Fruit: Dragon fruit is introduced in India recently and has high demand in the market. The species is non-browsable, grows to a short height. It has weak stem, hence need support for good growth and fruit production. Fruiting appears on hanging branches. This is a xerophytic plant and water requirement is quite negligible, hence well suitable for the low rainfall areas. This can be potentially used for live fencing. The species is propagated by cuttings and planted at close spacing of 3.0 m. hanging branches cover open spaces between plants and thus offer good protection against stray cattle.



Tridhara



Phalsa



Kumut



Karonda



Bamboo



Seabuckthorn

Figure 2. Different plants used for live fencing plants

Kumat: Kumat is known for production of edible gum which fetch very high price in market. The species is thorny and medium slow growing and very hardy against drought. Although goats browse it, but they do not trample it. The species can grow under neglect and form excellent live fence along the field boundary. It is propagated by seed and planted 3-4m apart. The species produces gum from cut ends from 4 years onwards when pruned in March-April. Pruned twigs are used for brush wood fencing and later as fuel wood. The thick branches are used for making small agricultural implements.

Kaitha/Wood apple: Wood apple is another minor fruit plant that requires conservation and protection. It is thorny, tall tree and produces edible fruits. It is propagated by seed. No improved varieties are available. It can be planted on field boundary at 8.0m spacing. Fruits of kaitha are non- perishable and processed for chutney.

Besides protection to the field, it acts like living pole replacing iron/wooden poles for barbed wire fencing. It is drought resistant and can be grown on poor and marginal soils.

Phalsa: Phalsa is a good minor fruit plant which can be multiplied by seed. It is a shrub and very good coppicer. Phalsa is drought resistant and has short gestation period. For effective live-fence it requires yearly pruning during month of Dec.-Jan. New coppice shoots arising in March flower profusely and bears small edible fruits. Phalsa is consumed fresh as table fruit and processed to prepare sharbat with striking red colour. Phalsa twigs are widely used for basket making due to elasticity in twigs.

Ber: Ber is thorny in nature and its several species are found throughout the country with different growth habits. It is deciduous plant with high drought resistant mechanism. Fruits are nutritive and tasty. It has excellent tolerance mechanism against salinity and alkalinity. Ber wood is light in weight with high strength, hence mostly used by farmers in making tool handles and in other agricultural implements.

Eastern prickly pear: Shade intolerant and drought hardy type of cactus species with short stature and perennial type with barbed bristle making it suitable plant for bio-fencing. It is usually known as the devil's-tongue and grows well in sandy, rocky and coastal scrub habits. It is endangered species and native to Canada. Flowers are yellow to gold in colour and born in the late spring. Fruits are edible with red or purple in coloured flesh.

Tridhara: A spiny succulent, drought hardy shrub which grows as ornamental hedge and reaches up to 3m height. Due to impregnable nature it prevents the livestock and animals to enter into orchards or farmlands hence well suited for fencing. It has many medicinal uses as its milky latex is poisonous and used as externally in swellings, boils, warts and other skin infections. This is also used in rheumatism, toothache, earache and asthma. Its plant also shows insecticidal properties.

Nirgundi: A common shrub of dry deciduous forest of sub-tropics is non-browsable, good coppice and frames excellent hedge. It is very responsive to pruning. It is widely used as herbal medicine particularly for joint pains. It constitute dense hedge. The species can be planted by seed/cutting in 3 rows spaced 25 cm in chess board pattern. It develops effective hedge in 2-3 years.

Pros and Cons of bio-fencing/live fencing

Pros

- Cheaper than the wired or wall fencing and long lasting
- Prevents soil erosion and maintains the soil structure
- Creates better microclimate for the orchard crop
- Environment friendly
- Some bio-fence plant give monetary benefits from produce such as fruits, leaves, wood, twigs etc.
- Helps in conserving the plant biodiversity
- They also provide food, fodder, fuel and fertilizer and also
- They act as windbreak

Cons

- Takes time in establishment and developing as effective fence.
- Sometime not much effective in the areas where stray cattle is severe problem
- There is chance of damage by high wind.
- Some plant species are browsable for small ruminants.

CONCLUSION

Biofencing or live fencing is an important practice followed in farms or orchards and need to be promoted in future for its diverse uses and also for environmental security. Warrants due research emphasis with

respect to quick and fast hedging property, planting techniques and aftercare. As species, performance may vary in accordance with edapho-climatic conditions of the particular region, hence there is need to evaluate these live fence species for growth, economics and effectiveness in protecting field crops.

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