

## **Punica granatum**

pomegranate, anar

L.

Punicaceae

### LOCAL NAMES

Arabic (darabhte-naiy); Bengali (assami,dalim); Burmese (thale,talebin,salebin); Chinese (shiliu); Dutch (granaatappel); English (wild pomegranate,pomegranate,dwarf pomegranate,tree of knowledge); Filipino (granada); French (grenade,grenadier,pomme grenade); German (granatapfel); Greek (ródi); Gujarati (dadam); Hindi (anardana,anar); Indonesian (delima); Italian (melograne,Granato,melogranate); Khmer (totum); Lao (Sino-Tibetan) (phiilaa); Luganda (nkomawawanga); Nepali (daarim,oriya); Spanish (granadillo,granada,pomogranado); Swahili (kudhumani,komamanga); Swedish (granatäpple); Tamil (dhanimmapandu,madulam,telugu); Trade name (pomegranate,anar)

### BOTANIC DESCRIPTION

*Punica granatum* is a small multi-stemmed shrub/tree 5-10 m tall. Canopy open, crown base low. Stem woody and spiny, bark smooth and dark grey.

Leaves simple, 2-8 cm long, oblong or obovate, glabrous, oppositely placed, short-petioled surface shining.

Flowers regular, solitary or in fascicles at apices, 4-6 cm. Petals lanceolate, 5-7, wrinkled and brilliant orange-red. Hypanthium coloured, 5-8 lobed. Anthers numerous. Calyx persistent.

Fruit a round berry, 5-12 cm, pericarp leathery. Interior compartmentalized with many pink-red sections of pulp-like tissue, each contains a seed grain. Fruits globose with persistent calyx and a coriaceous woody rind.

Seeds numerous, angular with fleshy testa, 1.3 cm long.

Two subspecies are recognized on basis of ovary colour; subsp. *chlorocarpa* and *porphyrocarpa*. Numerous cultivars, some dating to the 13th Century, are known.

The specific epithet *granatum* derives from Latin *granum* "grain" and means "many-grained".

Only two species, *P. granatum* and *P. protopunica*, are known for this monogeneric family with close affiliations to the Lythraceae. *P. protopunica* is endemic to Socotra and is listed as an endangered plant in the IUCN Red List.

### BIOLOGY

This is a hermaphroditic species. Flowering is observed from mid-April to May in India. Fruiting begins in the 7th or 8th year and fruits take 6-7 months to mature. The number of fruits may vary from 20-25 for young trees to 100-150 for 10 year old trees and even 200-250 fruits for older trees. Yield varies with tree size.



Fruits and leaves. (Arnoldo Mondadori Editore SpA)



Detail of fruits and flowers. (Morton J.)



Seedling of the dwarf form of pomegranate damaged by microscopic mites of the Eriophyoidea (Neser S)

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## ECOLOGY

Pomegranate is susceptible to fire, frost (at -11 deg C damage to trees is irrecoverable) and strongly alkaline soils but tolerates soil compaction, drought and seasonal waterlogging.

## BIOPHYSICAL LIMITS

Altitude: up to 1 500 m

Mean annual temperature: 20 deg C

Mean annual rainfall: 1 000 mm

Soil type: Prefers well drained, heavy, light and medium soils. Will also do well on calcerous soils.

## DOCUMENTED SPECIES DISTRIBUTION

Native: Afghanistan, Iran, Libyan Arab Jamahiriya, Tunisia

Exotic: Egypt, Greece, India, Indonesia, Israel, Italy, Kenya, Morocco, Pakistan, Russian Federation, Saudi Arabia, Spain, Sri Lanka, Tanzania, Turkey, Uganda, United States of America



The map above shows countries where the species has been planted. It does neither suggest that the species can be planted in every ecological zone within that country, nor that the species can not be planted in other countries than those depicted. Since some tree species are invasive, you need to follow biosafety procedures that apply to your planting site.

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### **PRODUCTS**

**Food:** The seeds have a fresh, sweet-sour, very pleasant taste, grenadine, a reduced juice from fresh pomegranate seeds, is common in Northern India for desserts, marinating and tenderizing meat due to its proteolytic enzymes. Dried pomegranate seeds, 'anardana', has culinary importance as spice for vegetable and legume dishes in Northern India. They impart a subtle, sweet-sour and tart flavour popular in Punjab and Gujrat. The edible fruit portion contains 10% sugars, 36.6 mg Vitamin C/100 ml of juice, 2.6% protein, 0.1% Phosphorous, 0.4% Potassium, 0.03%, 0.1% Calcium and 0.13% Magnesium.

**Fodder:** The leaves are browsed by domesticated stock.

**Fuel:** Tree branches used as firewood.

**Timber:** The wood is hard and durable, mostly used in making farm implements.

**Tannin or dyestuff:** The root bark yields a black ink rich in tannins and useful in dyeing/tanning leather.

**Medicine:** The bark of the pomegranate tree may be used as a very strong purgative, but it has several serious side-effects. The fresh root bark is used in an anthelmintic preparation, the alkaloid punicine is responsible for this activity. Unripe fruit and flowers are significant emetics. Ripe fruits are laxative and blood enriching also useful in managing sore throat, spre eyes, brain diseases and chest troubles.

### **SERVICES**

**Erosion control:** This deep rooting tree is important in soil erosion control, and is planted along rivers to stabilize banks.

**Shade or shelter:** Pomegranate is an important shade tree and its wind firm stature makes it a good wind break.

**Reclamation:** *P. granatum* is a drought tolerant tree suitable for arid and semi-arid zone afforestation. A resilient tree whose withering is mentioned as the judgement of God upon evil on the earth.

**Soil improver:** Pomegranate leaf litter decomposes slowly and is suitable for mulching.

**Ornamental:** Leaf resprouts of the pomegranate are a beautiful light red, making it a suitable ornamental choice for gardens and amenity parks, especially in cultivar 'nana'. The beautiful persistent calyx in pomegranate was inspiration for King Solomon's and later other European crowns.

**Boundary or barrier or support:** The tree is sometimes used for fencing.

**Intercropping:** Pomegranate grows along well with grapes in Mediterranean countries.

**Pollution control:** Used in water purification.

**Other uses:** Greatly mentioned in the Bible, the skirt of the priest's blue robe and ephod was adorned with the reprints of pomegranates.

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### **TREE MANAGEMENT**

Generally, *P. granatum* is slow growing. Lopping, pruning and coppicing are recommended management practices. Thinning should be done occasionally to ensure good aeration and interception of sunlight. Periodical spraying with 2 g mancozeb/litre of water is enough. Fruit cracking damage due to severe drought and boron deficiency is a serious problem tackled by irrigation and spraying 0.25% Boron solution. Plants should be protected from browsers. The fruit borer is controlled by removal of affected fruits and use of insecticides. Generally most pests are managed by hygienic orchard management and insecticides. Root pruning limits fruiting. When harvested unripe fruits may be stored for 5-6 months.

### **GERMPLASM MANAGEMENT**

No seed pretreatment is required. Average germination rates between 30-70% are recorded for pomegranate. Seeds lose viability after a month. There are about 31 000 seeds per kg.

### **PESTS AND DISEASES**

The fruit borer, Anar butterfly, *Virachola isocrates* is a devastating pest of pomegranate. Bored fruits are attacked by fungi and rot away. The larvae of the fruit flies *Anastrepha ludens*, *Dacus dorsalis* and *Dacus zonatus* feed inside the fruit causing rot and fruit drop. Bark eating caterpillars *Indarbela tetraonis* and *Indarbela quadrinotata* prevent sap translocation in pomegranate. *Xanthomonas punica* causes irregular light-brown leaf lesions that become dark brown. *Agrobacterium tumefaciens* causes fruit pulp rot in humid countries. Trees occasionally die from a twig canker caused by *Ceuthospora phyllosticta*.

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### **FURTHER READNG**

[http://www.ang.kfunigraz.ac.at/~katzner/engl/generic\\_frame.html?spice\\_bot.html](http://www.ang.kfunigraz.ac.at/~katzner/engl/generic_frame.html?spice_bot.html)

IBPGR. 1986. Genetic resources of tropical and subtropical fruits and nuts (excluding Musa). International Board for Plant Genetic Resources, Rome.

Thampman PK (ed.). 1993. Trees and tree farming. Peekay Tree Crops Development Foundation. Kerala, India.

### **SUGGESTED CITATION**

Orwa C, A Mutua, Kindt R , Jamnadass R, S Anthony. 2009 Agroforestry Database:a tree reference and selection guide version 4.0 (<http://www.worldagroforestry.org/sites/treedbs/treedatabases.asp>)