HORTICULTURE NOTE: NO. 2
TOMATOES

By P.B. Bull,* formerly Senior Horticulturist, D.P.I., Laloki

Common name: Tomato

Botanical name: *Lycopersicon esculentum*

Part of a tomato plant, showing stems, leaves and fruit

WHAT THE PLANT LOOKS LIKE

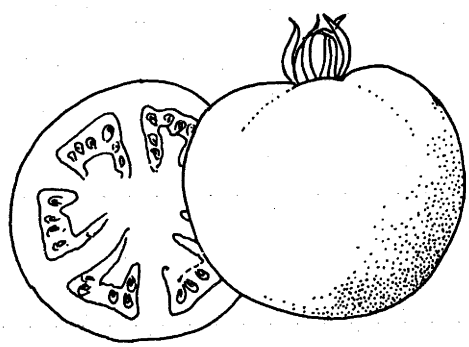
The tomato plant is herbaceous (soft-stemmed) with weak, hairy, branched stems 0.7-2 m long. The leaves are also hairy. Both the stems and the leaves have a strong smell.

The small yellow flowers grow in clusters, so the tomatoes also grow in clusters or 'trusses' of up to 12 fruits. The fruit vary in shape (they can be round or elongated), and size (20-200 g). The ripe tomtoes are usually red, though some varieties are pink or yellow.

WHERE IT GROWS

Tomatoes grow best when the days are hot (21-28°C) and the nights are fairly cool (15-20°C). 'Heat tolerant' varieties will set fruit even when the night temperature is above 20°C. These are necessary in Papua New Guinea, below 500 m. Above 500 m most varieties can be grown. Tomatoes grow best below an altitude of 1500 m

During the wet season tomato fruit split as they ripen, and diseases are more of a problem. The best quality fruits are grown in the dry season or in drier areas.



Cross-section of fruit to show flesh and seeds

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SOILS AND FERTILIZERS

Tomatoes grow best in well-drained soils, which have a high organic matter content. The soil should be at least 70 cm deep with a pH between 5.5 and 7. Using raised ridges improves drainage.

Nitrogen is needed for good plant growth; whilst potassium is needed for good fruit quality in tomatoes. At D.P.I. Laloki, two applications of fertilizer are made:

Basal dressing: Up to 500 kg/ha 12.12.18 fertilizer is broadcast (spread) along each ridge before transplanting. This is about 30 g per plant.

Side dressing: Four weeks after transplanting up to 500 kg/ha 12.12.18 plus 200 kg/ha muriate of potash (KCl) is applied carefully around each plant. This about 30 g of 12.12.18 and 15 g of muriate of potash per plant.

VARIETIES

There are two main types of varieties: determinate and indeterminate. Determinate varieties produce about five trusses, then stop growing when the plant is about 1 m tall. Indeterminate varieties keep growing and produce a new truss after every third leaf. Indeterminate types will produce a greater yield over a long period of time, but they are much more difficult to stake. It is usually best to grow determinate types.

The following varieties are recommended:

Lowlands

. NG 7536 (available from D.P.I. Laloki) is bacterial wilt resistant, heat tolerant, determinate and large fruited.

. Walter Improved (available from Yates, Australia) can be used where bacterial wilt does not occur.

Highlands

. NG 7536 should be used if bacterial wilt occurs.

Other varieties grown successfully include:

. Grosse Lisse (large fruit)

. Walter Improved (large fruit)

. Floradel (large fruit)

. Roma (small, egg-shaped fruit)

HOW IT IS GROWN

Seed

To plant 0.1 ha with tomatoes, you need 15 g of seed. There are approximately 3000 tomato seeds per 15 g.

Obtaining seed

You can buy tomato seed from some shops. Because tomato is self-pollinated, and seeds produce plants like the parent plant, you can also save your own seed.

For details of how to collect tomato seed see the article 'Producing and saving your own vegetable seeds' (HARVEST, Volume 9, No.2, pp. 1-4).

Sowing

Seed can be sown into Jiffy 7's plastic cups or trays. Sow two seeds per hole and thin to one after 7-10 days.

Transplanting

Transplant after 3 to 5 weeks, when the seedlings are 10-15 cm tall.

Seed sowing, nursery care, and transplanting are described in Farming Note No. 10, *Vegetables*.

Plant spacing

Prepare ridges 1.2 - 1.3 m apart before transplanting. Plant a single row of plants, 0.6 m apart along each ridge.

Staking and mulching

During the dry season, tomatoes can be grown without staking on a kunai grass mulch. The mulch helps to stop weeds growing. However, better quality fruit are obtained when the plants are staked, particularly for wet season crops or in wetter areas.

Alternatively you can make a trellis or fence to which to tie the tomato plants.

Pruning

No pruning is necessary.

Irrigation

When rainfall is low, tomato plants should be irrigated every 3 days for the first 2 weeks after transplanting. After that, irrigation once a week is enough. Flood irrigation down the furrows is the best way to irrigate tomatoes.

Weeding

The tomato crop should be kept free of weeds, by hoeing between the plants and between the rows.

Protected cultivation

For wet season crops, an open sided house with a polythene roof, can be used. A gap in the the roof allows the hot air to escape. The roof keeps rain off the plants, so good quality tomatoes can be produced, even during wet weather.

TIME TO MATURITY

Tomatoes take from 6 to 10 weeks from transplanting to the start of harvesting.

In the lowlands, using determinate varieties, at least 80% of the total yield from one planting of tomatoes will be picked over the first 4 weeks of harvesting. After this the crop is usually not worth picking unless the plants are very healthy.

In the highlands, using determinate varieties, most of the fruit matures over 6 weeks. A few tomatoes can be picked for up to 3 months from the start of harvest, but they are usually smaller.

If you want to grow tomatoes to supply the market all the time, you should sow a new crop every month in the lowlands, and every 6 weeks in the highlands.

HARVESTING, STORAGE AND YIELDS

It is best to pick tomatoes just as they start to change colour from green to red. As tomatoes become riper (darker red) the flesh becomes softer. Soft tomatoes are more likely to be damaged on the way to market.

After harvest, fruit can be stored at a temperature of 8°C or higher. The higher the temperature, the quicker the tomatoes will ripen.

Yields range from 1 to 6 kg of good quality fruit per plant. A yield of 2 kg per plant is equivalent to 25t/ha when the crop is grown at the recommended spacing.

HOW IT IS USED

Tomatoes are a protective food rich in Vitamins A and C. They also contain iron and other minerals. They are mainly used as a salad vegetable and sliced in sandwiches, or cooked in stews.

INSECT PESTS

Tomato fruitworms, *Heliothis armiger* and *Spodoptera litura* can cause damage to stems and fruits. Spray with Orthene (13 ml per 10 litres water) as necessary. Other insecticides which can be used are listed by Thistleton (1983).

DISEASES

Bacterial wilt is the most important disease of tomatoes in the lowlands and parts of the highlands. This disease is discussed in Plant Pathology Note No. 15. It is controlled by using a resistant variety.

Leaf spots caused by several different fungi are a major problem. These diseases are discussed in Plant Pathology Note No. 16. Spraying once each week with Dithane M 45 (200 g per 100 litres water) is recommended. During wet weather, Benlate (50 g per 100 litres) is more effective. If bacterial leaf spots occur, Copper Oxychloride (300 g per 100 litres) should be applied weekly, in combination with Dithane or Benlate.

Root knot nematodes are sometimes a problem. These are discussed in Plant Pathology Note No. 5.

FURTHER READING

Clarkson, D. (1980). Root knot nematode. Plant Pathology Note No. 5. *Harvest* 6(3): 154-156.

Clarkson, D. and Tomlinson, D. (1982). Fungal diseases of tomato. Plant Pathology Note No.16. *Harvest* 8(1):39-40.

Farming Note No.10. Vegetables. Department of Primary Industry, Port Moresby. Revised 1983.

Fitzgerald, J. and Bull, P.B. (1983). Producing and saving your own vegetables seeds. *Harvest* 9(1):1-4.

Greve, J.E. van S. (1983). Safe storage for small quantities of seeds. *Harvest* 9(1):5-9.

Thistleton, B.M. (1983). *Recommendations for the Control of Pests*. Technical Report 83/4. Department of Primary Industry, Port Moresby.

FURTHER INFORMATION

For further information and advice on vegetable growing contact the Area Horticulturist in your region. The regions and addresses for the Area Horticulturists are as follows:

New Guinea Islands Region

Lowlands Agricultural Experiment Station, P.O. Keravat
East New Britain Province
Tel: 926251 or 926252

Momase Region

Bubia Agriculture Research Centre,
P.O. Box 73, LAE
Tel: 424933

Papua Region

D.P.I., Laloki
P.O. Box 417, KONEDOBU
Tel: 281068

Highlands Region

Kuk Agricultural Research Station, P.O. Box 339
MOUNT HAGEN
Tel: 551377

Copies of this Horticulture Note can be obtained from:
The Publications Officer,
Publications Section, D.P.I.,
P.O. Box 417, KONEDOBU.