# Asparagus

agriculture,
forestry & fisheries

Department:
Agriculture, Forestry and Fisheries
**REPUBLIC OF SOUTH AFRICA**

# Asparagus

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# PART I: General aspects

## 1. CLASSIFICATION

Scientific name: *Asparagus officinalis*

Common names: Asparagus

Family: Liliaceae

## 2. ORIGIN AND DISTRIBUTION

Asparagus originated from Asia Minor, parts of Russia, the Mediterranean region and the British Isles, where it still grows wild in saline areas. It has been cultivated for food by the ancient Greeks and Romans, who also used its berries and underground stems to cure bee stings, dropsy, heart troubles and toothache. Wild forms of asparagus have been found growing in South Africa and they are known as “katbos”.

## 3. PRODUCTION LEVELS AND AREAS

- *South Africa*

Asparagus is grown next to urban areas, mainly in Tarlton to the west of Krugersdorp, Eikenhof, south of Johannesburg and the Eastern Free State.

- *Internationally*

## 4. DESCRIPTION OF THE PLANT

The immature shoots or spears are eaten. They are thick and juicy but become slender and tough in summer.

- *Roots*

The roots are numerous and fleshy and they occur horizontally in the soil.

- *Stem*

The stems die down every year whereas the fleshy roots increase in size and number from year to year.

- *Leaves*

It is a vigorous-growing bushy plant with finely divided or simple leaves on long, heavily branched stems.

- *Flower*

Asparagus is a herbaceous, dioecious perennial plant that is 1 to 3 m in height, with either staminate or pistillate flowers.

## 5. CULTIVARS

General information on cultivars and factors to be considered when choosing a cultivar(s).

i. California 500

ii. Connover's Colosal: It produces slender, pointed buds

iii. UC72: This cultivar produces large green-tipped spears and is somewhat resistant to fusarium wilt.

iv. UC66

v. UC157: It is a high yielding, F1 hybrid cultivar. It produces lender and cylindrical spears that are smooth, with very tight heads. This cultivar also has some tolerance to Fusarium oxysporium sp. asparagi.

vi. Mary Washington

## 6. CLIMATIC REQUIREMENTS

- *Temperature*

Asparagus is adapted to grow in a wide variety of weather conditions. It produces better quality and higher yields when it matures during periods when the temperatures are about 16° to 25 °C, especially after a long period of fern growth. The growing period is shortened in colder climates because of the limited period for fern production. Spear growth is rapid during warmer conditions, resulting in greater fibre production within the spears. Spear tips also tend to lose some compactness under the conditions mentioned.

- *Rainfall*

Adequate moisture should be maintained for good germination and early seedling growth, especially during the first two months. Water stress during this early stage can lead to reduced yields during the life of the planting.

## 7. SOIL REQUIREMENTS

Asparagus grows well in well-drained, fertile, sandy loam or loams, but can also do well in heavier soils if well taken care of. The soil should be deep because the roots usually penetrate 3 m or deeper. Asparagus is fairly tolerant to high salt content and alkaline conditions. It is sensitive to high soil acidity and grows well in soil with a pH of 6 to 6,7. Lime should be applied to soils with a pH lower than 5,5 before planting.

# PART II: Cultivation purposes

## 1. PROPAGATION

Asparagus is propagated from seed.

## 2. SOIL PREPARATION

Soil tests should be done in the first year and then every other year, and lime should be applied according to soil test results. Asparagus should not be planted in any field in which it had been planted in the past. The soil should

be fumigated to reduce the incidence of Fusarium wilt and several root rots if planted in fields previously planted to asparagus. Sites which retain standing water for more than eight hours after a heavy rain should be avoided. The site should also be fairly level, free of rocks and weeds such as Bermuda grass, nutgrass and Johnson grass. It is recommended that the soil should first be loosened to a depth of at least 450 mm, using a ripper. The soil should be ploughed deep after fertilising and the furrows ploughed open with a plough.

## 3. PLANTING

Both direct seeded and transplanted asparagus can be planted in single or double rows. The furrows are usually made 2 m apart, depending on the width of the implements utilised. Seedlings should be planted 300 mm apart in the furrows.

Asparagus is planted by either direct seeding or transplanting seedlings to the permanent field. The seedlings are usually ready for transplanting 10 months after sowing. Only the strongest seedlings should be planted because the plants have to last for 15 to 20 years.

Planting depth is critical in asparagus production. Asparagus will produce a large number of small spears that are not commercially marketable if planted too shallow and the spears will be very large, but few in number if planted too deep. The seedlings are initially covered with only 50 mm of soil and later to the depth of 100 mm. The seed should be sown in fairly deep furrows and the furrows should be filled up to allow the crowns to be 100 mm beneath the soil surface.

## 4. FERTILISATION

Fertilisation recommendations should be based on soil analysis. Acid soils should be limed before planting by ploughing it at least four weeks before any other fertilisation. Dolomitic lime is recommended in cases of magnesium deficiencies at a rate of 2 000 kg/ha. A quantity of 1 500 kg fertiliser of the mixture 2:3:2 (22) per ha may be ploughed in deep, shortly before planting.

An application of a 2:3:4 (21) fertiliser mixture at a rate of 900 kg/ha is a general annual recommendation on established lands. Nitrogen should be applied in the form of LAN at a rate of 150 kg/ha on moist soil, one week after

commencing harvesting and six (6) to eight (8) weeks after the harvesting period. Phosphorus is important for root growth, especially during establishment, and it is needed only at planting. Organic fertilisers are not recommended to fertilise asparagus fields.

## 5. IRRIGATION

Asparagus should be irrigated as required to keep the fern growing vigorously. Irrigation should be applied every two weeks and 50 mm of water should be supplied in the absence of rain. After the root system has been established, irrigation is needed only during extreme drought. During harvesting, 50 to 75 mm of water may be applied every three (3) to four (4) weeks if there is no rain.

## 6. WEED CONTROL

Weeds may be controlled chemically by applying registered pre-emergence herbicides. Weeds may also be controlled by shallow disking before the spears appear.

## 7. PEST CONTROL

- *Cutworms (Euxoa spp.)*

Cutworms cause damage by eating off the part of the spear underground. As a result, the damaged spear develops with a crooked tip and cannot be marketed.

- CONTROL

Poisoned bait, consisting of 20 kg bran or maize meal and 60 g of trichlorfon (Dipterex) or 100 g endosulfan (Thiodan) may be applied on the rows.

- *Asparagus beetle (Crioceris aspargi)*

Both the adults and larvae attack spears and ferns. The beetle eats the tips of the spears as

soon as they emerge from the ground and as a result, the product cannot be marketed. The larvae also secrete a dark fluid, which stains the plants. Adult beetles lay eggs on the spears and the crop cannot be marketed as it is impossible to wash off the eggs.

- CONTROL

- proper sanitation
- practise crop rotation
- plant resistant cultivars
- apply or use registered chemicals only.
- Asparagus fly (Zacherata asparagi)

Attacked spears become crooked and when they emerge above the ground the growing tip resembles the handle of a walking stick. The eggs are laid in the shoots of the plant and the larvae tunnel into the shoots and weaken them. Heavy infestations may reduce the quantity of assimilates in the crown and the following season's yields may be reduced.

## 8. DISEASE CONTROL

- *Fusarium wilt*

Symptoms are poor growth and yellowing of the plant followed by withering and drying up of a few branches accompanied by brown discolouration of the parts near the base. It spreads to all the branches and the entire plant withers and dies.

- CONTROL

- Poorly drained soil which stays wet for a long time and also very fine-textured soil should be avoided.
- The soil should be kept loose and well aerated.
- Avoid injury to the crown during the harvesting and while working in the top growth with a disc harrow.
- New crops should not be cultivated near old infested lands or on soil previously planted with asparagus.

- *Asparagus rust*

Infected plants are characterised by the occurrence of dark-red pustules on the ferns.

- CONTROL

- planting resistant varieties
- always use registered chemicals.

## 9. OTHER CULTIVATION PRACTICES

- *Ridging*

Ridging is done when white or blanched asparagus is required. The developing shoots are earthed up by hilling up the soil over the crown.

## 10. HARVESTING

- *Harvest maturity*

Asparagus is harvested as soon as the tips of the spears emerge above the ridges. The spears should be cut before they are too long and before the tips begin to spread.

- *Harvesting methods*

Asparagus for the fresh market is harvested by hand. The spears are cut off about 150 mm to 200 mm underground with a chisel-shaped cutting iron. It is recommended that the first harvesting should last for about four (4) weeks to avoid depletion of food reserves, while the second harvest should last for eight (8) weeks. The harvesting season in all succeeding years should last 10 to 12 weeks.

Asparagus may also be harvested by mechanical harvesters but these are non-selective and they usually reduce yield by 35 to 50% and quality compared to hand harvesting.

## PART III: Post-harvest handling

Fresh asparagus is highly perishable and deteriorates rapidly at high temperatures. Spear growth, loss of tenderness, loss of flavour, loss of vitamin C, and development of decay can also occur at moderately high temperatures. Therefore, the harvested crop must be rapidly precooled, preferably by hydro cooling before packing and kept at a low temperature and high relative humidity. The spears should also be washed.

### 1. SORTING

For the fresh market, spears that are crooked or malformed, and those with open green tips or a ridge at the butt end should be discarded.

### 2. GRADING

Asparagus spears are graded according to thickness and tied in bunches. Good-quality spears are clean, straight, tender, long, large in diameter and bright green with compact tips. The spears should be uniform in length.

### 3. PACKING

The bundles are packed into cartons or wooden boxes. They may be packed unwrapped, or in cellophane or plastic wrappers. It is not advisable to pack asparagus in non-perforated film because the extent of increase in carbon dioxide and decrease in oxygen may be damaging and because enough ethylene may accumulate and toughen the spears.

### 4. STORAGE

Storage temperatures are between 0° and 2 °C, with a relative humidity of 90%. High relative humidity helps to prevent desiccation, particularly at the butt ends and it is frequently obtained by placing the butts of asparagus on wet pads or prepackaging spears in perforated film. The packaged product must be held in an upright position because the spears continue to elongate. If stored in a horizontal position, the spear tips will bend upward, thereby affecting their market appearance. Asparagus should not be stored with apples or

other ethylene-producing material as it may be damaged by exposure to this gas. Undesirable elongation, curving and toughening may result from adverse exposure to ethylene.

### 5. TRANSPORT

Asparagus should always be shipped under refrigeration. The crop for canning should be transported to the factories at least 5 to 10 hours after harvesting.

### 6. MARKETING

Asparagus is marketed fresh or canned.

## PART IV: Production schedules

| ACTIVITIES | JANUARY | FEBRUARY | MARCH | APRIL | MAY | JUNE | JULY | AUGUST | SEPTEMBER | OCTOBER | NOVEMBER | DECEMBER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil sampling | | | | | | | X | X | X | X | X | X |
| Soil preparation | | | | | | | X | X | X | X | X | X |
| Planting | | | | | | | | X | X | X | X | X |
| Fertilisation | | | | | | | | X | X | X | X | X |
| Irrigation | | | | | | | | X | X | X | X | X |
| Pest control | | | | | | | X | X | X | X | X | X |
| Disease control | | | | | | | X | X | X | X | X | X |
| Weed control | | | | | | | | | X | X | X | X |
| Pruning | | | | | | | | | | | | |
| Leaf sampling | | | | | | | | | | | | |
| Harvesting | X | X | X | | | | | | | X | X | X |
| Marketing | | | | | | | | | X | X | X | X |

## PART V: Utilisation

Asparagus shoots can be consumed either green or blanched. Green asparagus is usually eaten fresh with butter or a sauce and the blanched asparagus is mainly canned.

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