

Section 17.3
**PINEAPPLES: OPTIMUM GROWTH
AREAS**

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Background Information

- The pineapple, i.e. *Ananas comosus* (**Photos 1 and 2**), is a frost sensitive tropical and subtropical plant.
- It is often grown at low altitudes close to the sea, which has a moderating influence on climate because, while a diurnal range in temperature is important for growth and fruit quality (Smith, 1998), the plant cannot tolerate extreme temperature variations (Neild and Boshell, 1976).

Site Requirements for Pineapples

- Pineapples can grow well under a wide range of rainfall from MAP 600 - 1 200 mm (Smith, 1998).
- However, irrigation is necessary when MAP is < 500 mm or when consecutive months of low rainfall occur (see later).
- Daily mean temperatures around 23 - 24°C are considered optimum for both acid and sugar content of pineapples.
- Plant growth decreases rapidly at < 15°C and > 30°C, with sunburn likely to occur above 32°C and “black heart” at temperatures < 8°C (Neild and Boshell, 1976; Smith, 1998).
- Daily maxima and minima of 30°C and 20°C respectively have been found to be a favourable diurnal temperature range (Neild and Boshell, 1976).
- High humidity (daily mean > 75%) reduces sunburn and improves growth in lower rainfall areas (Smith, 1998).

Pineapple Production in South Africa

- South Africa accounts for 6% of the world’s pineapple production in a market dominated by Thailand, Indonesia, the Phillipines and Kenya

(SA Yearbook, 2005).

- Of the ~ 6 350 ha planted to pineapple in South Africa, 69% is in the Eastern Cape and 30% in KwaZulu-Natal (Statistics SA, 2002).
- Two varieties are grown, viz. the smoother, larger and juicier Cayenne and the smaller, but sweeter Queen variety, with production shifting more and more towards the Cayenne variety.
- In South Africa pineapples flower within 14 - 20 months of planting, with summer fruit in the Eastern Cape taking ~ 5 months to mature and winter fruit up to 7 months, implying that the plant crop is harvested at 18 - 24 months (Bathurst, 2005).
- Of this R120 - 130 million per annum agricultural industry (SA Yearbook, 2005), ~ 14% is sold on markets, ~ 84% used for processing and the remaining 2% is exported (2000/1 - 2003/4 figures; NDA, 2005).
- Annual yields are around 16 t/ha, with those in KwaZulu-Natal slightly higher than those in the Eastern Cape (Statistics SA, 2002).



Climatic Rating for Pineapple Production

Using precipitation criteria and temperature criteria, a climatic rating table was developed by Neild and Boshell (1976) to score each month’s rainfall and temperature potential out of a maximum of 10, thus giving a maximum score of 120 for temperature and 120 for rainfall, with a highest possible score of 240.

Determination of Climatically Optimum Growth Areas for Pineapples

The temperature ranges and scores for pineapples are as follows:

Temperature Ranges and Scores for Pineapples (after Neild and Boshell, 1976)			
Monthly Means of Daily Maxima (°C)	Score	Monthly Means of Daily Minima (°C)	Score
≥ 38.0	0	≥ 24.0	0
36.0 - 37.9	1	23.0 - 23.9	1
34.0 - 35.9	2	22.0 - 22.9	3
32.0 - 33.9	4	21.0 - 21.9	4
29.0 - 31.9	5	19.0 - 20.9	5
27.0 - 28.9	4	18.0 - 18.9	4
24.0 - 26.9	3	17.0 - 17.9	3
21.0 - 23.9	2	14.0 - 16.9	2
18.0 - 20.9	1	< 14.0	1
< 18.0	0		

For pineapple production potential, precipitation is evaluated as follows:

- Monthly precipitation is divided by 10, with any monthly amount in excess of 100 mm scoring 10. The largest possible annual precipitation score would thus be 120.
- Areas with MAP less than 500 mm are considered unsuitable for pineapple production, except under irrigation.
- Areas with more than 3 consecutive months less than 15 mm or 4 consecutive months less than 25 mm or 5 consecutive months less than 40 mm precipitation per month are also considered unsuitable without supplementary irrigation.

Rainfall values were derived from the 1 arc minute (1' x 1' latitude x longitude) mean monthly rainfalls generated for South Africa by Lynch (2004), as described in **Section 2.2**, while monthly means of daily minimum temperatures were computed from the 1 arc minute daily temperature series for the 50 year period 1950 - 1999, derived by Schulze and Maharaj (2004), as described in **Section 2.1**.

Distribution Patterns over South Africa of Climatically Optimum Growth Areas for Pineapples

Based on the temperature score alone, the extreme eastern parts of South Africa are suitable for pineapple production, with the high producing Eastern Cape areas sub-optimal. Using the rainfall score alone, the coastal areas of KwaZulu-Natal and parts of those of the Eastern Cape score well. The composite score map shows climatically optimum areas, according to the Neild and Boshell (1976) criteria, to be heavily focused along the coastal areas of KwaZulu-Natal and the northern coastal strip of the Eastern Cape, with composite scores there in excess of 120 out of a possible 240.

References (In the sequence in which they appear in this Section, with the full references given in Section 22)

1. Smith, J.M.B. (1998)
2. Neild, R.E. and Boshell, F. (1976)
3. SA Yearbook (2005)
4. Statistics SA (2002)
5. Bathurst (2005)
6. NDA (2005)

Photo 1 - <http://www.mjgkramer.com/brunei/pineapple.jpg>

Photo 2 - <http://www.artificialplants.co.uk/aa-pineapple.jpg>

Citing from this Section of the Atlas

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