

Section 15.2

Eragrostis curvula YIELD ESTIMATION
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Background Information

- *Eragrostis curvula*, also known as Weeping Love Grass or Oulandsgras, is a tufted perennial with culms varying in height from 0.5 to 1.5 m ([Photos 1 and 2](#)) and long, narrow bright green to blue-green leaf blades ([Photo 3](#)) up to 3 mm wide (Van Oudtshoorn, 1992).
- It is one of the economically most important pasture grasses in South Africa, establishes easily, and provides early spring grazing. It is highly productive (Van Oudtshoorn, 1992).
- *E. curvula* is commonly used for pasture and hay, as well as for the maintenance of erosion works (Van Oudtshoorn, 1992).
- Its grazing value under natural conditions is average, with only medium palatability and when grazed, should not be defoliated shorter than 0.1 m. It does, however, become more palatable when fertilised (Smith, 1998).
- In high rainfall areas, *E. curvula* is common in disturbed areas such as uncultivated lands (hence ‘oulandsgras’) and is often associated with overgrazed and trampled veld (Van Oudtshoorn, 1992).

Site Requirements for *Eragrostis curvula*

- *Eragrostis curvula* has a summer (September to March) growth period in areas where MAP > 600 mm and preferably > 700 mm (Smith, 1994; 1998), although it is difficult making hay from it when rainfall is too high (cf. also the effective rainfall fraction component of the yield equation in the first shaded box).
- It grows best where MAT is in the range 13 - 16°C (Smith, 1994). Under warmer conditions, when summer season heat units exceed 1 800 °days, its dry matter yield starts declining again (cf. dry matter component of the yield equation in the first shaded box).
- *Eragrostis curvula* has a preference for well drained, dystrophic loams (Smith, 1994).

Procedures for Determining Climatically Optimum Growth Areas and Yields of *Eragrostis curvula*

Dry matter yield of *Eragrostis curvula* may be estimated by Smith’s (1994) rule-based approach (cf. first shaded box) using the effective rainfall for the summer months October to March in conjunction with accumulated summer month heat units (base 10°C), and assuming that base fertilizer levels have been brought up by addition of appropriate applications of phosphates and potassium (with applications of K increasing as N application is increased) and that at least 250 kg nitrogen per ha has been applied. Adjustments to the climatic yield potential for management and soil conditions are given in the second shaded box.

Determination of *Eragrostis curvula* Yield Estimate, Based on Smith’s Climatic Criteria

Considering only the climatic criteria of Smith’s (1994) rule-based approach for estimating the yield of *Eragrostis curvula*, his tabulated information was expressed in equation form (Schulze, 1997) as

\[ Y_{ec} = P_{eom} \cdot P_{su} \cdot D_{ec} / 100 \]

where

- \( Y_{ec} \) = *Eragrostis curvula* yield (t/ha/season)
- \( P_{eom} \) = effective rainfall fraction for October to March
- \( P_{su} \) = accumulated rainfall (mm) for October to March
- \( D_{ec} \) = dry matter yield index for *Eragrostis curvula*

with

- \( P_{eom} = 0.60 + 0.00125 (P_{su} - 480) \) for \( 400 < P_{su} < 720 \)
- \( P_{eom} = 0.90 - 0.00063 (P_{su} - 720) \) for \( 720 < P_{su} < 960 \)
- \( P_{eom} = 0.75 - 0.00125 (P_{su} - 960) \) for \( 960 < P_{su} < 1040 \)
- \( P_{eom} = 0.65 - 0.00063 (P_{su} - 1040) \) for \( 1040 < P_{su} < 1300 \)

and

- \( P_{su} \) = accumulated heat units (base 10°C) for October to March
- \( D_{ec} = 1.6 + 0.0010 (H_{su} - 1000) \) for \( 1000 < H_{su} < 1400 \)
- \( D_{ec} = 2.0 + 0.0020 (H_{su} - 1400) \) for \( 1400 < H_{su} < 1800 \)
- \( D_{ec} = 2.8 - 0.0010 (H_{su} - 1800) \) for \( 1800 < H_{su} < 2200 \)
- \( D_{ec} = 2.4 - 0.0020 (H_{su} - 2200) \) for \( 2200 < H_{su} < 2800 \)

where \( H_{su} \) = accumulated heat units (base 10°C) for October to March with lower limit of 1000 and an upper limit of 2800° days.
Yields of *Eragrostis curvula*, based on the climatic criteria above, were mapped by applying these criteria to the one arc minute (1° x 1° of a degree latitude/longitude) databases of median monthly rainfalls for South Africa (Lynch, 2004; Section 2.2) and monthly means of daily heat units (Section 8), derived from daily temperatures (Schulze and Maharaj, 2004).

### Adjustments to the Climatic Yield Potential of *Eragrostis curvula* for Management and Soil Factors

The dry matter yield of *Eragrostis curvula*, estimated from the equations in the first shaded box, is a climatic yield potential which may be modified for different management levels by the following multipliers (Smith, 1994):

- Experimental : 1.0
- Good : 0.7
- Excellent : 0.9
- Satisfactory : 0.6
- Very Good : 0.8

The multiplier to adjust for soil potential is as follows (Smith, 1994):

<table>
<thead>
<tr>
<th>Soil Potential</th>
<th>Soil Properties</th>
<th>Multiplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Humic, red, yellow-brown, dystrophic, ± 850 mm deep, loam or clay loam</td>
<td>1.0</td>
</tr>
<tr>
<td>Moderate</td>
<td>Black, grey, mesotrophic, 500 - 750 mm deep clay or sand</td>
<td>0.9</td>
</tr>
<tr>
<td>Low</td>
<td>Grey, duplex, eutrophic, 300 - 500 mm sand</td>
<td>0.8</td>
</tr>
</tbody>
</table>

### Determination of *Eragrostis curvula* Yield Estimate, Based on Smith’s Climatic Criteria (continued)

Yields of *Eragrostis curvula* exceed 12 t/ha/season in the cooler northeastern areas of the Eastern Cape, the Midlands and higher-lying western and northern areas of KwaZulu-Natal, western Swaziland and cooler areas in the east of Mpumalanga. In the eastern Free State yields average 6 - 8 t/ha/season and in Gauteng 8 - 10, with a tapering off in yields to 4 - 6 t/ha/season towards the western parts of its growth area.

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


### Citing from this Section of the Atlas

When making reference to this Section of the Atlas, please cite as follows:

Section 15.2 Pasture Crops: Eragrostis curvula Yield Estimation