

CLIMATE SMART GRAIN SORGHUM VARIETIES: IMPORTANT AGRONOMIC TRAITS TO LOOK OUT FOR



Introduction

Climate change is an on-going phenomenon. The climatic patterns have shifted in Lesotho from earlier well-known short summer season characterised by erratic rains and some drought spells during the growing season, to unusual floods, low temperatures and limited sunlight. The onset of the planting season is now delayed by either no rainfall or flooding conditions that interfere with both sowing of the grain crops and also proper growth and development of those that are already planted. Moreover the heavy rains that unpredictably dominate the summer season associated with cloudy conditions with low temperatures have brought a new challenge of sunlight availability and heat units for optimum photosynthetic ability of the crops.

These changing climatic conditions require all the players in variety selection to be conversant with scoring morphological traits important for adaptation under climate change in grain Sorghum. The leaflets shall show few of these traits important for adaptation to climate change.

1. Stay Green Trait

- The plant exhibits the ability to retain green leaves which are important for photosynthesis for a longer period even after flowering. This trait is exhibited by sorghum varieties that withstand dehydration better and for longer. This trait is often scored as the equivalence of the number of green leaves remaining on the plant.



Figure 1 sorghum plants with reduced number of green leaves due to drought. the lower leaves have started to dry out.



Figure 2 Sorghum plants with intact green leaves under drought

2. Rooting system

Sorghum varieties with more extensive rooting system characterised by secondary roots have potential to withstand water scarcity more than those without. The secondary roots are finer and grow from the stem basal nodes. They branch more than the primary roots. They can reach lateral distribution of about 1- 2m. Thus are able to access soil water from the top most layer of the soil immediately after light showers of rain, covering even the inter-row spacing



Figure 3 secondary roots of Sorghu

Floating of basal roots, secondary roots in response to flooding is one morphological attribute that enhances sorghum varieties tolerance to flooding and waterlogging. Floating of these roots enables the roots to access oxygen and respire. Under flooded conditions the roots become more fibrous in nature.

3. Short seasoned variety

Short seasoned grain sorghum varieties complete their life cycle within a short period of time. They are termed tolerant to most stresses of summer cropping seasons as they are able to escape factors like drought and flooding. Moreover they require lower amount of heat units and light intensity as compared to long seasoned varieties. Generally the short seasoned sorghum varieties are low grain yielders.

4. Leaf architecture

Leaves the broad leaves of sorghum are important for maximizing photosynthetic capacity of the plant, however the leaf roll trait is very important to reduce transpiration rate under incidental high temperature conditions.



Figure 4 The leaves of sorghum roll under high temeperature conditions in order to prevent water loss due to high traspiration rate

5. The Stems

Stems that are well covered with husks and have thicker waxy layer to reduce transpiration rate is an important trait to consider. This trait is very important for drought tolerance.

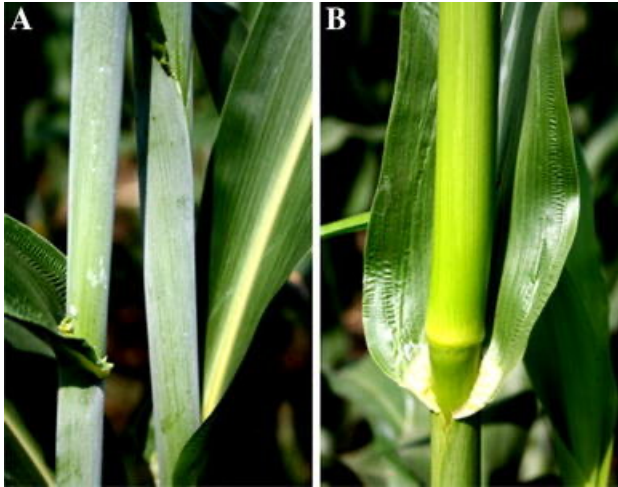


Figure 5 A) less waxy stem/ internodes, b) thick waxy internodes of sorghum that aid in transpiration water loss

- Longer internodes exhibit tolerance to flooding/ water logging conditions as well. Generally such varieties grow taller when soil conditions are waterlogged but remain at normal plant height under optimum soil moisture conditions.

Crop diversification for climate smart grain sorghum production

- Under prevailing weather conditions, it is highly recommendable to grow different varieties of sorghum in the field, with varying agronomic advantages so as to mitigate the effects of climate change that the crop may encounter during the growing season.
- Such varieties may be planted in rows to facilitate ease of separation at harvest if need be.
- Sorghum crop producers should at all time in a season expecting the irregularity of the weather. Thus, a prompt crop husbandry response is required of the farmers.

Good yields of grain Sorghum are guaranteed when appropriate cultural practices are applied.