



FORAGE CEREALS FOR DRYLAND PASTURE PRODUCTION

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Forage cereals” is the collective term for a group of annual cereal species that have been bred for pasture production. They are rye and stooling rye (*Secale cereale*), white oats (*Avena sativa*), black oats (*Avena strigosa*), red oats (*Avena abyssinica*), Triticale or Korog (*x.Triticosecale*) and wheat (*Triticum aestivum*). Triticale is a cross between wheat and rye.

Forage cereal species are temperate in origin (cool season species) and are thus planted in autumn for late autumn and winter production, with some producing forage into the early spring months. There are a few varieties that grow until early summer. Different types within each species occur which relates to the flowering behaviour or floral induction i.e. what triggers the onset of flowering determines the type. Winter types require vernalization, while spring types do not. Vernalization refers to environmental conditions of cold temperatures and short days, followed by longer days or increasing day-length. The length of time to flowering determines the duration of the pasture or how long it will persist, since the plant will not regrow after flowering. Stress signals of various kinds can also trigger flowering if they are acute enough.

For forage purposes and specifically for autumn planting, the so-called spring types are classified as short-duration types. The winter types are split into medium- and long-duration types. The medium-duration types require less cold days for flowering than the long-duration types which will only flower

after a more extended period of cold. Amongst the long-duration types there are now also varieties that may extend into early summer.

Types of forage cereals and their role in a fodder flow

Short-duration types

These are varieties that have no cold or short day requirements to induce flowering. Hence they will grow from seedling to flowering plants in the shortest time that the prevailing moisture and temperature conditions allow.

The short-duration types will grow relatively quickly after establishment and produce grazeable forage once or twice depending on the planting time, moisture availability and the growth stage at grazing. They can be planted in early autumn (March) to provide grazing in late autumn/early winter. Alternatively the short-duration types can be planted later, after maize silage is harvested, and then provide grazing in early to mid-winter. If used for grazing they should be grazed at about 20-30cm plant height. Growing them out too tall before grazing will result in elevation of the growth point and thus limit regrowth for subsequent grazing. If there is a third grazing, the plants are often already reproductive and thus carrying a large proportion of stem rather than leaf (low leaf: stem ratio) resulting in lower forage quality due to the higher fibre content. The short-duration varieties can alternatively be used for silage by letting the pasture grow out to accumulate herbage bulk to

just before inflorescence emergence and then cut for silage. This gives a single cut only as there will be no regrowth after cutting.

The fast, upright growth habit and versatility with regard to sowing date i.e. early to late autumn, and their relatively short growth period, make these varieties good gap-fillers in the fodder flow.

In some instances the short-duration ryes are planted in a mixture with ryegrass to provide bulk in the early winter after which they do not regrow and the pasture reverts to ryegrass only. This is a somewhat controversial practice and at this stage not backed by research. It has been successfully used on some farms, especially where winter temperatures are low such as the western areas of KZN.

Medium duration types

Varieties in this category will grow for a longer time period and remain vegetative (in leafy stage) for longer than the short-duration types because they require some cold days to induce flowering. Generally from an autumn (March) planting medium-duration types would start flowering from mid-winter onwards. Medium duration varieties are slower growing at establishment than the short-duration types but faster than the long-duration types.

The medium-duration types produce best when they are planted in mid-autumn and can still utilize some residual soil moisture from the summer to establish well. They produce three to four grazings, depending again on the grazing management and the temperature and moisture conditions. Generally, varieties in this category produce forage mainly in mid-winter up to late winter. The late winter grazing is likely to be more stem than leaf, as the plants start to change to the reproductive stage. These varieties are a good source of feed for dryland situations where grazing is needed mainly in the winter months but not

into spring. Medium duration types may combine well with forage peas to provide a good quality first harvest with the peas in flower or reproductive.

Long-duration types

The varieties with the longest cold requirement for flowering to commence, are categorized as long-duration types. These varieties have the longest growth duration and last up to early spring with some varieties even extending through to late spring/early summer. With the long growth duration comes slow establishment and slow growth in the autumn and winter. They are prostrate or low growing, especially during autumn and winter. This applies particularly to the ryes and less so to the oats. Rye in this category is often referred to as stooling rye because of its denser, low growing tufts. Due to the flat growth habit of the long-duration ryes, they have traditionally been used more for sheep than cattle. However the long-duration oats varieties and some of the newer stooling rye varieties are suitable for cattle.

This group is the most diverse in terms of duration and thus the number of grazings will depend very much on the actual variety. Variety trial data is very helpful to assess the performance and duration. Some of the varieties will give five grazings up to early September, while others will give six or even seven grazings up to October/November depending on rainfall and temperature and on the grazing management used. Again towards the end of the growing season the plant material will be more stem (low leaf:stem ratio) with a lower forage quality as flowering begins.

Long-duration types should be planted in early to mid-autumn to allow for good establishment with residual soil moisture from the summer rainfall and allow good tuft development before the lower temperatures reduce growth rates. Figure 1 shows the typical growth curves of the three types.

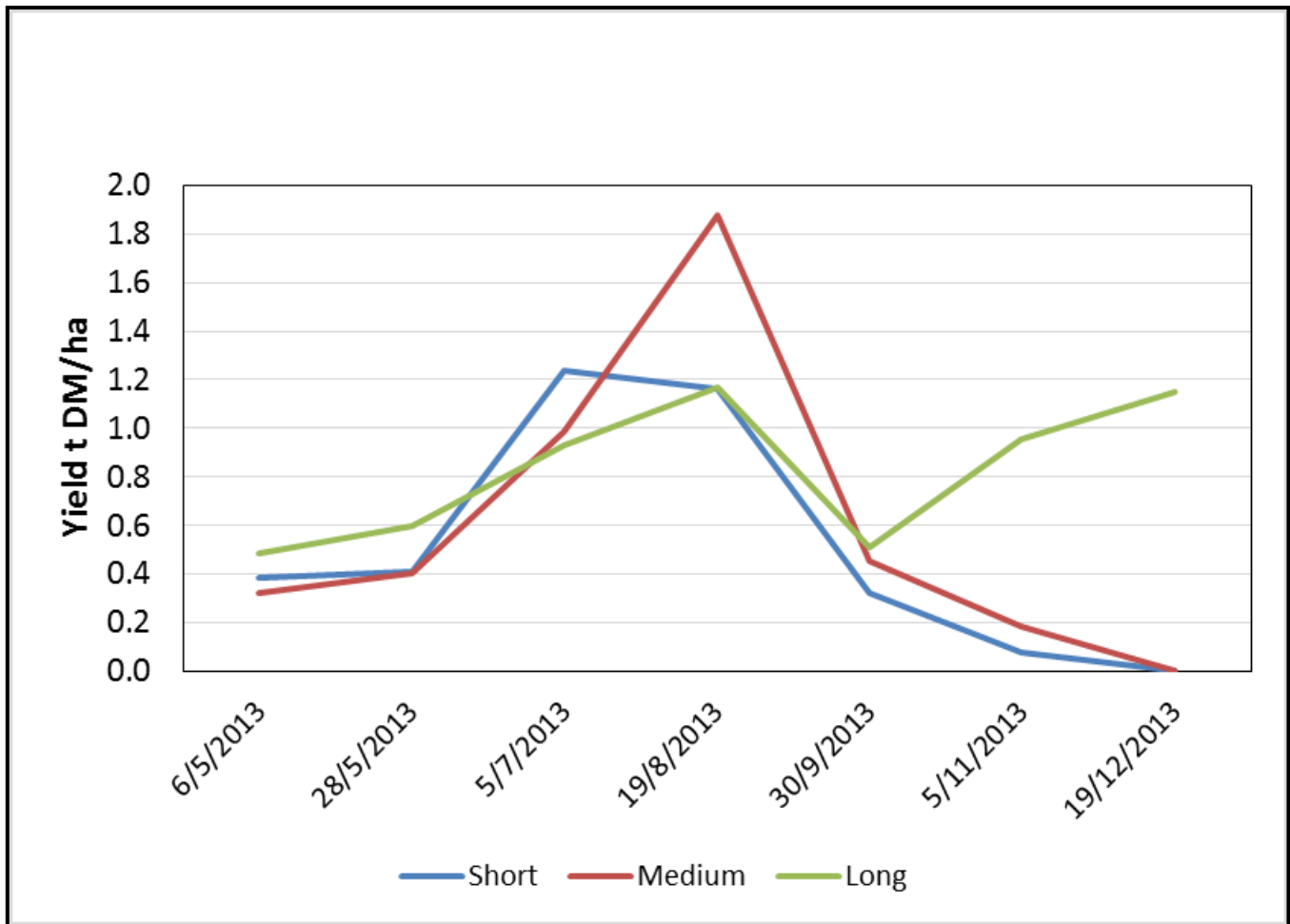


FIGURE 1: Dry matter yield of a forage cereal trial by the ARC at Cedara in 2013

Establishment

White oats has the largest seed of all the forage cereals and thus needs to be planted at the highest sowing rate of 50 to 60kg/ha. All others can be planted at 40 to 50 kg/ha. The seed can be drilled using a minimum till planter or a conventional seedbed can be prepared. At establishment the P and K should be corrected as per the soil analysis results.

Pasture management

Nitrogen at 30 to 40 kg N/ha can be applied once the seedlings have established. Another dressing is then applied after grazing. The number of nitrogen

applications will depend on the number of grazings that can be obtained, which depends on the type and the variety planted. If the pasture is anticipated to become reproductive during the next regrowth phase then no more fertilizer needs to be applied. Applying nitrogen fertilizer with no prospect of rain may be expensive and needs to be a strategic business decision.

For grazing the pasture should be used when it is between 20 and 30cm high.

Figure 2 shows some locally available varieties and where they fit with regards to growth duration.

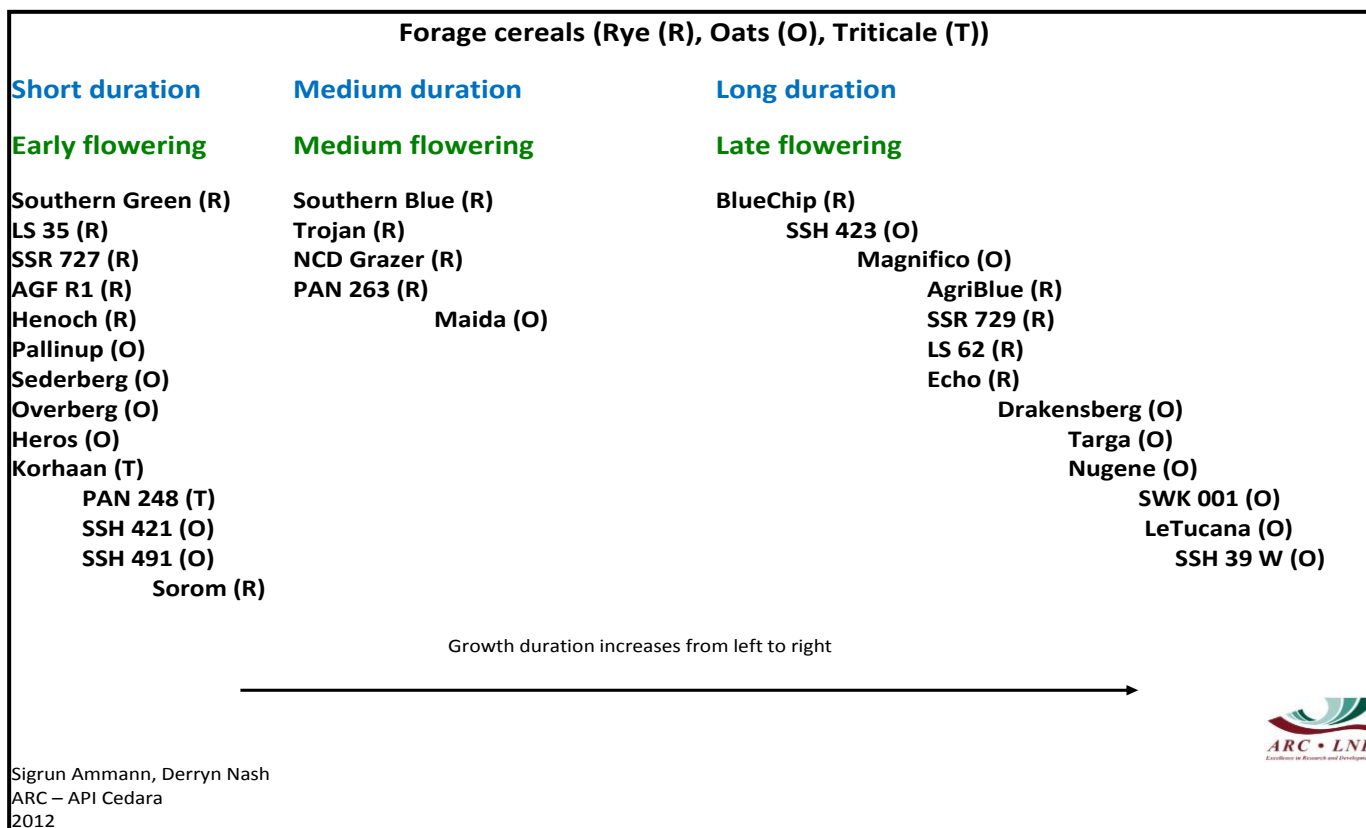


FIGURE 2: Characterization of varieties according to flowering and growth duration: Growth duration increases from left to right.

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