



Short, medium and long duration cereals for cover crops and winter forage

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Forage cereals are a group of annual crops that can be used by small-scale or commercial farmers. Examples include oats, stouling rye, triticale and barley. The ideal planting time for cereals is mid-February to early May, depending on the species and cultivar. Cereals, planted on time, can make use of the soil moisture from the last of the summer rains. Higher yields can be achieved with supplementary irrigation; however, this may not be the most efficient use of available water. They can be planted for livestock feed (grazed or conserved), or as a cover crop for soil health and erosion control. Planting after silage maize or a sorghum crop increases land productivity and fills a feed gap in the winter and early spring months. However, farmers and advisors need to know where cultivars fall within the short, medium and long duration scale in order to know when to plant and for which purpose each cultivar is best suited.

Short duration/early flowering types (spring types with no vernalisation requirements) can be planted in early autumn (late February/early March) to be grazed in late autumn/early winter or planted later in autumn (April/May) to provide grazing in early- to mid-winter. Short duration types are usually used for a single silage harvest or grazed once or twice. (Vernalisation is the process whereby a plant is dependent on a cold period, such as winter, to induce flowering.) Medium and long duration/medium and late flowering types (winter types, which require vernalisation to varying degrees) can be planted

earlier in autumn (March) and can be grazed several times. Medium/long duration cultivars need to be grazed before they begin flowering in order to regrow; if allowed to become reproductive before being defoliated, the crop will likely die, effectively acting as a short duration type. This may also happen if the cereal is cut or grazed too severely.

Two cereal cultivar trials were planted at Cedara in autumn 2019. In the first trial, 12 short duration cultivars were cut once to simulate a silage harvest. The cultivars were cut when their seed heads were at the soft dough stage, as beyond this stage the nutritive value decreases with advancing maturity.

The second trial evaluated the response of 27 medium and long duration cultivars to repeated defoliation. This trial was cut four times to simulate grazing. Cutting was done when most cultivars were 20 to 30 cm tall. The following cereal species were used in one or both trials: barley (*Hordeum vulgare*); white oats (*Avena sativa*); black oats (*Avena strigosa*); red oats (*Avena byzantina*); stouling and spring rye (*Secale cereale*); and triticale (*x Triticosecale*). Supplementary irrigation was used sparingly.

The highest mean yield in the short-duration trial was produced by Overberg oats at 6.98 tons DM ha⁻¹ (Figure 1), however yields in the top ten cultivars were not statistically different. The mean yield of all cultivars was 5.84 tons DM ha⁻¹.

The percentage seed heads (the pink circle in Figure 1) may be indicative of the quality of silage, where high uniformity of flowering is desirable. Cultivars with close to 100% seed heads, and a low within-cultivar variation (indicated by the error bars in Figure 1), are considered better for silage production. This would

suggest that LS 35 and Southern Green stooling ryes and Goanna and KM 10 triticales would be suited to production for silage, while Overberg oats, with only 50% seed heads and high variability, may be less desirable for silage and probably more suited to grazing or hay.

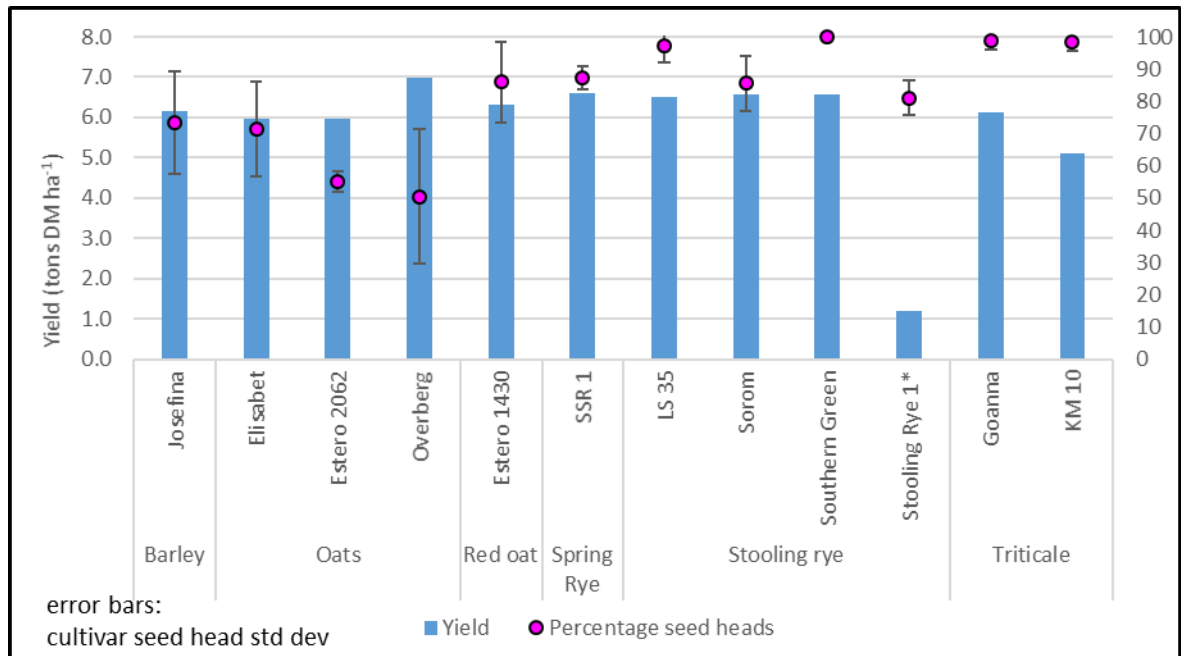


FIGURE 1: Dry matter yields and percentage seed heads for short duration forage cereal trial planted in 2019.

* cultivars given under code were given our own code.

Cultivars varied in the number of days it took from planting to harvest at soft dough stage (Figure 2). The earliest silage harvest was Josefina barley and KM 10 triticale (83 days after planting) and the cultivars that had the latest silage harvest were

Elisabet oats, Overberg oats and Estero 1430 red oat (166 days after planting). The time to flowering for the short duration cultivars was between 75 and 139 days after sowing.

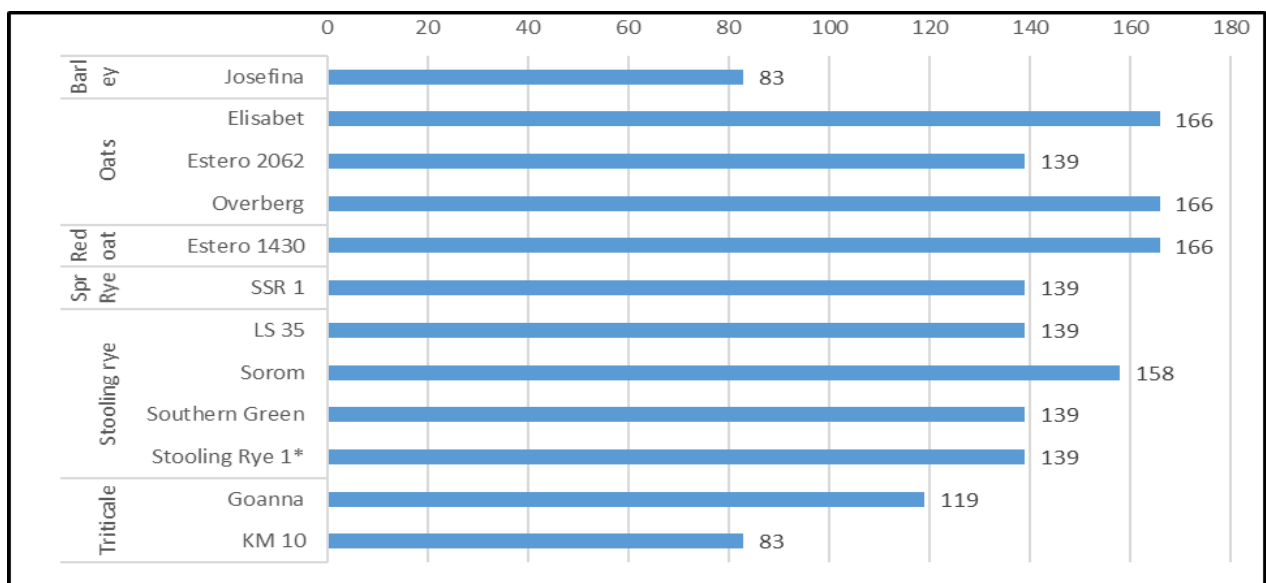


FIGURE 2: Days to harvest of short duration cereal cultivars, harvested as a single silage cut.

* cultivars given under code were given our own code.

There were no statistical differences in the dry matter yields of the top 12 medium and long duration cultivars out of 27 cultivars in the second grazing trial (Figure 3). The mean total yield was 4.16 tons DM ha⁻¹. Some yields may have been detrimentally impacted by cutting too short (5 cm rather than 8 cm), as the regrowth took longer to recover and, subsequently, produced a lower yield.

The cultivars with a high yield in the first cut are considered to be quick to establish. In this trial Saddle oats, Moby barley and Saia black oats, with

yields of 2.67, 2.64 and 2.63 tons DM ha⁻¹, respectively, are considered quick to establish (Figure 3). In general, the white and black oats and some triticale (e.g. Tuckerbox) were quick to establish, while the stouling ryes and some triticale (e.g. Triticale 1) were slower to establish.

Cultivars producing a higher yield in the third and fourth cuts (September and October) in the medium to long duration trial are usually characterised as long duration (Figure 3 and 4).

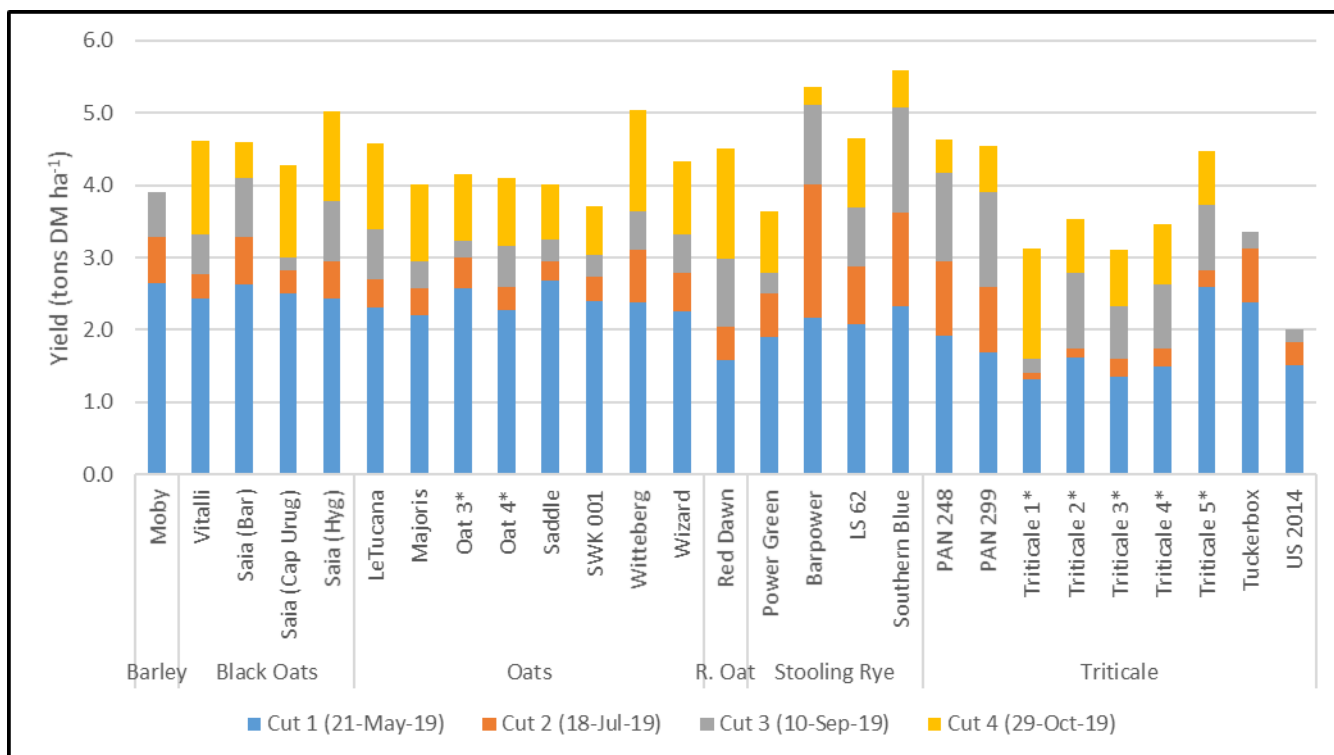


FIGURE 3: Dry matter yields for medium and long duration forage cereal trial planted in 2019.

Error bars indicate total yield std dev per cultivar. * cultivars given under code were given our own code.

The yield over the season, flowering dates, and prior knowledge of well-known cultivars were used to sort cultivars into a schematic for short, medium and long duration cereals (Figure 4). The poor performance of some medium and long duration cultivars illustrates the importance of correct categorisation of cultivars.

For example, the triticale cultivars Tuckerbox and US 2014, and Moby barley had low or below average yield and were dead by the fourth cut in October 2019 (Figure 3). Had they been classified as short

duration and used in the silage trial their true potential may have been better reflected.

When deciding on a cultivar to plant, it is important for land managers to know that not all cultivars will be suited to all purposes, although many cultivars can be used for multiple purposes. Short duration cultivars are usually quick to establish and, if planted in early autumn (end of Feb/March), will provide grazing in late autumn/early winter. Alternatively, if short duration cultivars are planted later in autumn,

after maize silage is harvested, they will provide grazing in early to mid-winter. They can also be left to grow taller and cut for hay or silage, but the crop may not regrow.

Medium duration cultivars can be quick or slower to establish. Medium duration types can be harvested three or four times, usually producing the bulk of their forage in mid- to late-winter.

Long duration cultivars can produce into early spring and some even into late spring or early summer, but are often slow to establish. Some varieties can give up to five harvests, depending on management and climatic conditions. Towards the end of the growing season forage quality will decrease, with low leaf: stem ratio and the onset of flowering, regardless of type.

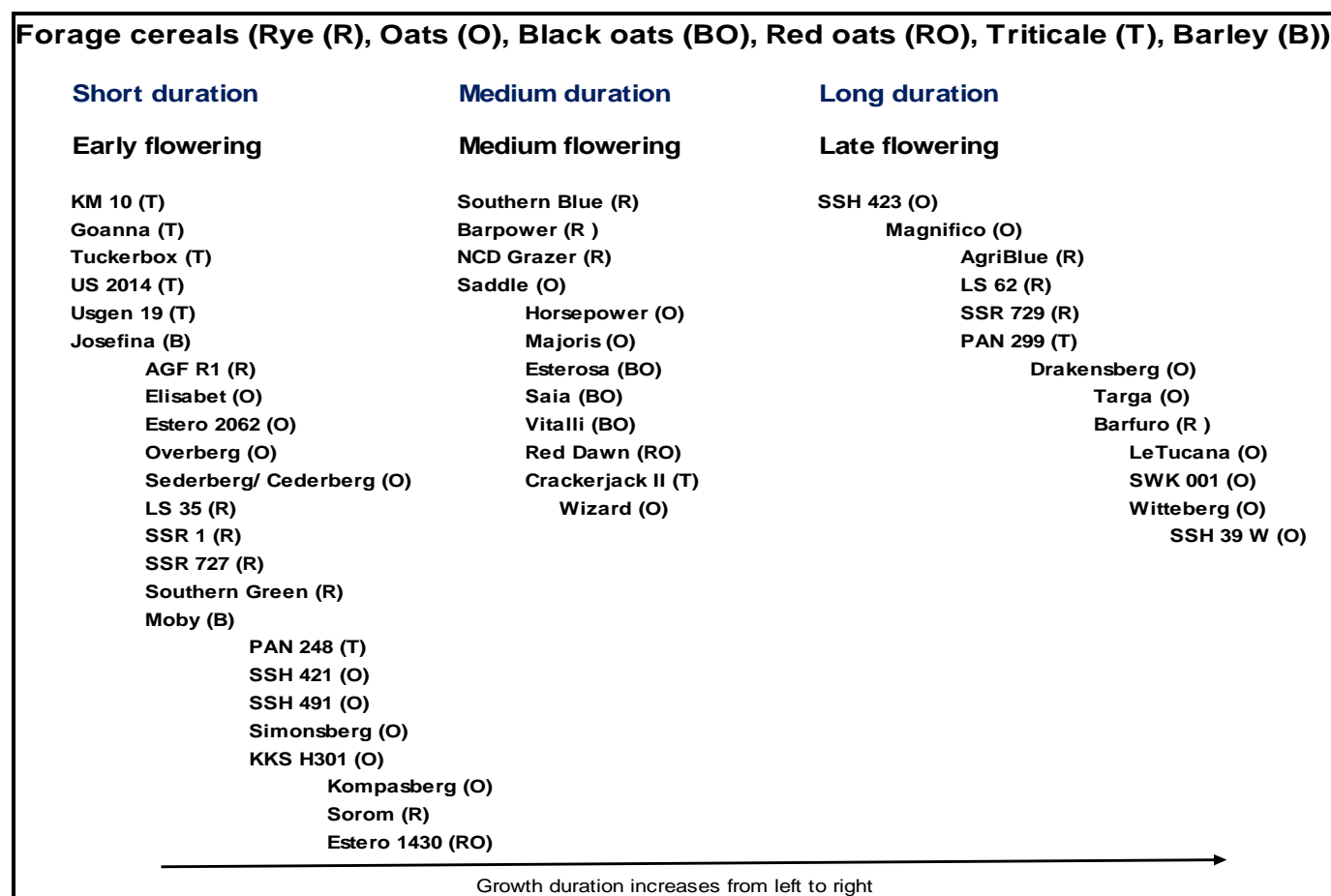


FIGURE 4: Characterization of varieties according to flowering and growth duration, from 2018 and 2019 trail data and previous knowledge (subject to change on further information): Growth duration increases from left to right. Schematic not to scale.

For more information, please refer to “Research & Technology Bulletin 2015/15: Forage cereals for dryland pasture production by Sigrun Ammann & Derryn Nash”. Contact your local seed merchants for advice on which varieties are suited to your area and specific requirements.

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