

Managing Phosphorus in Native Pastures

KEY POINTS

- **Applied phosphorus (P) boosts the legume component of native pastures, but too much leads to annual grasses and weeds.**
- **Grazing management is essential if fertilisers are applied to native pastures. Rotational grazing is critical to ensure the maintenance of the perennial native grass component of the pasture.**
- **Native pasture species have differing responses to P. Find out what species are on your farm.**
- **The more productive areas of the farm, such as valleys with deep soils, should be the first priority in applying fertilisers.**

A native pasture is defined here as any pasture in which native grasses are a significant component. Native grasses in these pastures provide stability, ground cover and respond to summer rainfall. Volunteer introduced annual legumes and grasses provide much of the winter and spring feed. Both components are essential for the long-term sustainability of the pasture.

Within any native pasture, there is usually a range of species present, possibly between 10 and 50 different species.

WHY FERTILISE NATIVE PASTURES?

Research has demonstrated that substantial increases in carrying capacity can be achieved by addressing P and sulphur (S) deficiencies in native pastures, and that in many cases economic responses can be achieved without a need for pasture sowing.

Applications of P stimulate the annual legume component of native pastures, increasing the nutritive

value of the feed and animal growth rates. Nitrogen (N) fixed by the legume stimulates the native perennial grass, but also the volunteer annual grasses and weeds. When fertiliser is applied to native pastures often an explosion in production of both annual grasses and legumes is seen, particularly in the spring. For species such as wallaby grass and redgrass this can be quite detrimental if there is insufficient grazing pressure, especially in the spring, because this allows annuals to shade and smother the native perennials.

KNOW YOUR SPECIES

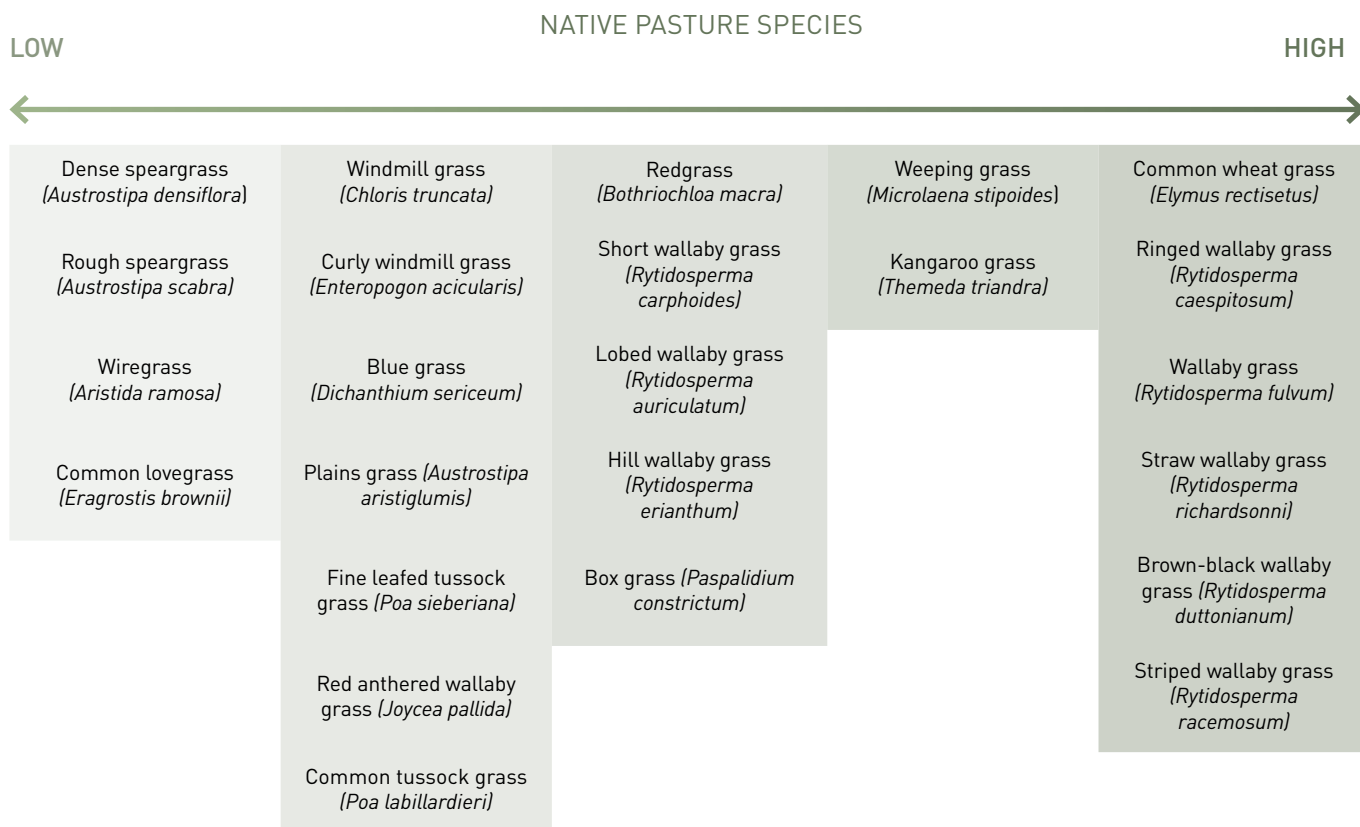
Knowing the species in your paddock provides an initial guide to how tolerant the perennial grass component would be to the increased P and the N that is fixed following P application, and the additional grazing pressure required to utilise the additional feed (for more information, please refer to Useful Resources Section).

Ringed wallaby grass (Rytidosperma caespitosum, formerly Austrodanthonia caespitosa), a higher quality native grass.



Table 1. Responsiveness of native grasses to applied phosphorus. Fertiliser applications should be focused on areas that contain species at the “high” side of the Table that are likely to give a response.

APPLIED PHOSPHORUS RESPONSE CONTINUUM



COMMON INTRODUCED SPECIES IN NATIVE PASTURES



Identification photos of each native species can be found at [Australia's Virtual Herbarium](https://www.australianvirtualherbarium.org/).



Native pasture species dominate the wooded hills in the background, while sown species dominate paddocks in the foreground.

While there is a large number of native grass species, most unsown paddocks are dominated by only a handful of species. Grazing and fertility management should be designed to suit the species with the highest value to the grazing enterprise. Difference in nutritive value are due to:

- Growing season of the perennial grasses; warm season (e.g., red grass, kangaroo grass) versus cool season (e.g. wallaby grass)
- Annual pasture grasses; high quality (e.g. annual ryegrass) or low quality (e.g. sweet vernal grass)

In many native pastures, the productivity of the system is driven by the annual components. These annual species are generally more responsive to fertiliser applications than are the native perennial grasses, but not always. A native pasture that has a high component of annual ryegrass will be more responsive to fertiliser than one that is dominated by sweet vernal grass. Responsiveness to fertiliser applications depends upon the dominant species that is present.

FACTORS AFFECTING RETURN FROM FERTILISER ON NATIVE PASTURES

Returns from investments in fertiliser can be better if:

- Existing pasture species are responsive to additional fertility (species on the “High P response” side of Table 1)
- Soils are deeper and therefore have a greater water holding capacity
- Existing soil fertility levels are low
- There are sufficient livestock to utilise the extra feed

On hill country there can be large variation in pasture growth within a paddock because of differences in soil depth. At the Orange EverGraze site, the rocky hilltops had only half the pasture production of the adjacent valleys.

GRAZING MANAGEMENT

As a general rule, more harm is done by lax grazing than by hard grazing, provided that ground cover targets are achieved.

Therefore, if money is spent on fertiliser, which in turn grows more grass, stocking rate should also be increased. The volunteer annual grasses and weeds tend to be more competitive as P and N fertility increases, leading to a decline in the native perennial grass component. This leads to an uneven feed supply, with an excess in the spring and then poor growth over summer leading to bare ground and erosion risks. To avoid this, it is recommended that legumes should be at most 20% of pasture on offer in spring. Grazing and lower fertiliser rates (<10 kg P/ha/year) can be used to hold the legume content to this level. At higher legume contents, a sown grass is required to provide stability.

Deferral of grazing over summer favours the native grass, because this is the time of year that they produce seed and build up root reserves. Paddocks can then be grazed in late summer or early autumn.

Hard grazing in summer and autumn favours annual legumes by providing bare spaces for them to colonise at the autumn break, but there are erosion risks of bare ground particularly on steep areas. Therefore, it is critical to maintain ground cover targets on slopes and shallower soils.



Onion grass (Romula rosea) has attractive purple flowers, but is an introduced weed of low fertility and competes with more productive species such as sub clover.

Some areas of native pasture should not be fertilised, such as rocky soils, steep hills, and westerly aspects. On these areas, responses to increased fertility are poor, and it is more important to preserve the native perennial grass cover to control erosion.

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HERBICIDES

Onion grass cannot be controlled by grazing management alone.

Improving soil fertility will reduce the level of onion grass in pastures by promoting other species like clover and annual grasses.

Another option is to use a relatively low-cost herbicide, metsulfuron methyl (marketed as "Brush-off®, Ally® and Associate®). This is applied in late June or July when the old corms are exhausted and before new corms grow. The treatment favours native perennial grasses, which are relatively inactive at this time of year. However, this herbicide will kill any clover present.

USEFUL RESOURCES

[AWI Feed on Offer Library](#)

[Understanding soil tests](#)

[5 easy steps](#)

[Australia's Virtual Herbarium](#)

[Atlas of Living Australia](#)

[Grasses of Australia](#)

FOR MORE INFORMATION

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