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## Characteristics of perennial grasses [poster]

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# Characteristics of Perennial Grasses

Compiled by Trevor Lacey and Geoff Moore, Department of Agriculture

**Growth characteristics of perennial C3 grasses:** This table presents information on range of a perennial grass species but is not a recommendation for them. Consider species characteristics in relation to local conditions and then source specific variety information before making decisions. Trial grasses before planting large areas (see key below for star rating system).

| Species  | Confidence level | Main varieties (Check variety specific recommendations) | Growth habit | Spreading habit | Minimum growing season (months) | Minimum rainfall (mm/yr) | Seed rates kg/ha           | Cool season growth | Toxicity - Many issues associated with grazing result from pure stands, particularly following good summer rains or when moving stock into lush pastures | Summer state | Drought tolerance | Inundation tolerance | Waterlogging tolerance | Salt tolerance | Minimum pH <sub>(CaCl2)</sub> | Frost tolerance | Fertility requirement or response | Sowing                                 | Soil types                            | Comments                                     |
|--|------------------|---|--------------|-----------------|---------------------------------|--------------------------|----------------------------|--------------------|--|--------------|-------------------|----------------------|------------------------|----------------|-------------------------------|-----------------|-----------------------------------|--|---------------------------------------|--|
| Cocksfoot ( <i>Dactylis glomerata</i> ) - (Mediterranean)                  | High             | Currie, Porto   | Tufted       | Seed            | 6                               | 500                      | 2 to 4 or 1 to 2 mixtures  | ****               | None reported  | **           | ***               | *                    | **                     | *              | 4.0                           | ****            | High                              | Autumn                                 | Range of soils but prefers deep loams | South of Perth                               |
| Perennial ryegrass ( <i>Lolium perenne</i> )                               | High             | Various   | Tufted       | Seed            | 8                               | 650                      | 5                          | ****               | Ryegrass staggers, potential nitrate poisoning   | **           | *                 | **?                  | ***                    | *              | 4.5                           | ****            | High                              | Autumn or late winter to early spring  |                                       |  |
| Phalaris ( <i>Phalaris aquatica</i> )                                      | High             | Various   | Dense tufts  | Short rhizome   | 6                               | 550                      | 5                          | ****               | Phalaris staggers and phalaris sudden death (alkaloids) cyanide?   | *            | ***               | **                   | ***                    | **             | 4.7                           | ****            | High to very high                 | Autumn or spring summer rainfall areas | Range but prefers loams               |  |
| Puccinellia ( <i>Puccinellia ciliata</i> )                                 | High             | Menemen   | Tufted       | Seed            |                                 | 375                      | 2                          | ****               | None reported  | *            | ****              | ***                  | *****                  | *****          | 5.0? persists at lower pH     | ****            | High                              | Autumn or late winter to early spring  | Saline soils                          |  |
| Tall fescue ( <i>Festuca arundinacea</i> ) – Summer-active                 | High             | Various   | Tufted       | Seed            | 7                               | 600                      | 5 to 8                     | ***                | Ergot occasionally   | ***          | **                | ***                  | ***                    | **             | 4.3                           | ****            | High to very high                 |  | Range but prefers medium to heavy     |  |
| Tall fescue ( <i>Festuca arundinacea</i> ) – Winter-active, summer-dormant | High             | Various   | Tufted       | Seed            | 6.5                             | 500                      | 5 to 8                     | ****               | Ergot occasionally   | *            | **                | ***                  | ***                    | **             | 4.3                           | ****            | High to very high                 |  | Range but prefers medium to heavy     |  |
| Tall wheatgrass ( <i>Thinopyrum ponticum</i> )                             | High             | Tyrell, Dundas  | Tufted       | Seed            |                                 | 375                      | 3 to 12 or 3 to 5 mixtures | **                 | None reported  | ***          | ****              | **?                  | *****                  | ***            | 4.5                           | ****            | High                              | Autumn or late winter to early spring  | Moderately saline soils               |  |
| Veldt grass ( <i>Ehrharta calycina</i> )                                   | High             | Mission   | Tufted       | Seed            |                                 | 325                      |                            | ****               | None reported  | ***          | ****              | *                    | **                     | *              | 4.0                           | ***             |                                   | Autumn                                 | Sandy soils                           | Roadside weed and can invade native bushland |

## Key

### Cool season growth

|      |   |
|------|---|
| *    | Dormant as requires temperatures >20°C/15°C (day/night temp.) for growth        |
| **   | Slow growth in cool season, as growth limited by temperatures <18°C/13°C        |
| ***  | Moderate cool season growth, as growth limited by temperatures <15°C/10°C       |
| **** | Good to very good cool season growth, only restricted by day temperatures <12°C |

### Summer state (refers to response to summer rain >15 mm)

|      |   |
|------|---|
| *    | Summer-dormant (negligible summer growth)                                   |
| **   | Slow (delayed) response to summer rain with low biomass production          |
| ***  | Responsive to summer rain   |
| **** | Highly responsive to summer rain – grows rapidly in response to summer rain |

### Frost tolerance

|      |   |
|------|---|
| *    | Sensitive, extensively damaged by frosts, with some plant deaths                          |
| **   | Low frost tolerance, typically green-leaf is killed by frosts and occasional plant deaths |
| ***  | Moderate frost tolerance, leaf damage when frosts < -3°C                                  |
| **** | High frost tolerance, usually minimal damage  |

### Inundation tolerance

|      |  |
|------|--|
| *    | Nil tolerance, killed by inundation of > 1 day               |
| **   | Low, tolerates short periods of inundation for < 1 week      |
| ***  | Moderate, tolerates inundation for 2-4 weeks                 |
| **** | High, tolerates extended periods of inundation of 1-3 months |

### Drought tolerance

|       |   |
|-------|---|
| *     | Low drought tolerance (growing season length typically >8 months)                         |
| **    | Moderate drought tolerance (growing season length typically >6.5 months)                  |
| ***   | High drought tolerance (annual rainfall >450 mm and/or growing season length >5.5 months) |
| ****  | Very high drought tolerance (annual rainfall >325 mm)                                     |
| ***** | Extremely drought tolerant (annual rainfall >250 mm)                                      |

### Waterlogging tolerance - classes adapted from McDonald et al. (1990)

|       |   |
|-------|---|
| *     | Nil, no tolerance of waterlogging, only grows on well drained or rapidly drained sites  |
| **    | Low waterlogging tolerance, can grow on moderately well drained sites (perched watertable within 30 cm for 1-3 weeks depending on the season)                                       |
| ***   | Moderate waterlogging tolerance, will grow on imperfectly drained sites (perched watertable within 30 cm of the surface for 3-6 weeks in an average season, longer in a wet season) |
| ****  | High waterlogging tolerance, will grow on poorly drained sites (perched watertable within 30 cm of the surface for > 10 weeks in an average season)                                 |
| ***** | Very high waterlogging tolerant, grows on very poorly drained sites, where the soil is inundated or the profile is saturated for > 3 months in most years                           |

### Salt tolerance

|      |  |
|------|--|
| *    | Nil, only grows on non-saline soils (ECe <200 mS/m)              |
| **   | Slight salt tolerance, grows on soils with an ECe 200-400 mS/m   |
| ***  | Moderate salt tolerance, grows on soils with an ECe 400-800 mS/m |
| **** | High salt tolerance, grows on soils with an ECe 800-1600 mS/m    |

### Confidence level for Western Australian conditions

|            |  |
|------------|--|
| Yellow     | Low – limited testing or grower experience   |
| Orange     | Moderate – some testing or grower experience |
| Green      | High – extensively grown or tested           |
| Dark Green | Native species                               |

A “?” following a value in the table indicates a best guess only.

## References

New South Wales Agriculture, Agnote series; Department of Primary Industries, Queensland DPI note series; Tim Wiley, Department of Agriculture; K. Greathead., P. Sanford, L. Cransberg. (1998) Perennial grasses for animal production in the high rainfall areas of Western Australia, Miscellaneous publication No. 2/98.




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# Characteristics of Perennial Grasses

Compiled by Trevor Lacey and Geoff Moore, Department of Agriculture

**Growth characteristics of perennial C4 grasses:** This table presents information on range of a perennial grass species but is not a recommendation for them. Consider species characteristics in relation to local conditions and then source specific variety information before making decisions. Trial grasses before planting large areas (see key below for star rating system).

| <br>Species | Confidence level | Main varieties<br>(Check variety<br>specific<br>recommendations) | Growth habit               | Spreading habit                        | Minimum rainfall<br>(mm/yr)<br>(Shallow water table<br>may remove rainfall<br>limitations) | Seed rates kg/ha                      | Cool season<br>growth | Toxicity -<br>Many issues<br>associated with<br>grazing result from<br>pure stands,<br>particularly following<br>good summer rains or<br>when moving stock<br>into lush pastures | Summer state | Drought tolerance | Inundation<br>tolerance | Waterlogging<br>tolerance | Salt tolerance                       | Minimum pH <sub>(CaCl2)</sub> | Frost tolerance                | Fertility<br>requirement or<br>response | Sowing                   | Soil types  | Comments   |
|---|------------------|--|----------------------------|--|--|---------------------------------------|-----------------------|--|--------------|-------------------|-------------------------|---------------------------|--------------------------------------|-------------------------------|--------------------------------|---|--------------------------|---|--|
| Bambatsi panic<br>( <i>Panicum coloratum</i> )  |                  | Bambatsi   | Tufted                     | No runners,<br>seed                    | 400 (325<br>south coast)   | 2                                     | *                     | Secondary photosensitisation   | ****         | ***               | ***                     | ***                       | ***<br>if not<br>waterlogged         | 5.5?                          | **                             | Moderate<br>to high                     | Spring                   | Medium<br>to heavy                                    | Best for drought tolerance and<br>heavy clay soil  |
| Bana / Elephant grass<br>( <i>Pennisetum<br/>purpureum</i> )                                |                  |  | Large<br>tussocks          | No runners,<br>no seed                 | 650  | none                                  | *                     |  | ****?        | **                | *                       | **                        |                                      | **                            | Low                            | Cuttings<br>early<br>spring             | All                      | Tall grass with good quality<br>and drought tolerance |  |
| Buffel grass<br>( <i>Cenchrus ciliaris</i> )  |                  | Biloela, Bella,<br>Viva, Gayndah                                 | Erect tufted               | Seed                                   | 300  | 2 to 3 or<br>0.5 to 2                 | *                     | Ergot occasionally, moderate to high<br>oxalates (big head in horses,<br>ruminants occasional nephrosis or<br>hypocalcaemia), high selenium on<br>some soils                     | ****         | ***<br>**         | **                      | *                         | **                                   | 5.5?                          | **                             | Moderate<br>to high                     | Spring                   | Light to<br>medium<br>texture<br>and clays            | Low cold tolerance – suggest<br>for north-eastern agricultural<br>region, low rainfall station<br>country only |
| Consol lovegrass<br>( <i>Eragrostis curvula</i> )   |                  | Consol   | Tufted                     | Seed                                   | 400  | 0.3 to 1 or<br>0.3 to 0.5<br>mixtures | * <sup>1/2</sup>      |  | ****         | ***               | *                       | **                        | **                                   | 4.0                           | ***                            | High                                    | Spring                   | Acid<br>sands to<br>loams                             | May lose feed quality quickly if<br>grazing not controlled   |
| Couch<br>( <i>Cynodon dactylon</i> )  |                  |  |                            | Below ground                           | 500  |                                       | *                     | Bermuda grass staggers   | ****         |                   |                         | **                        |                                      |                               | **                             | Low                                     | Spring                   | Light<br>sandy<br>soils                               | Weed of crops, hard to remove  |
| Curly windmill grass<br>( <i>Enteropogon<br/>acicularis</i> )                               |                  |  | Small tufted               | Seed and<br>rooting from<br>stem nodes |  |                                       | *                     | None reported  | ****?        | ***               |                         |                           | **                                   | 4.7                           | ***                            |   |                          | Medium<br>to heavy<br>soils                           | Native species - long lived  |
| Digit grass<br>( <i>Digitaria eriantha</i> )  |                  | Premier digit<br>grass   | Tufted                     | Runners,<br>seed                       | 450  | 1 to 2                                | *                     | None reported  | ****?        | ***               | *                       | **                        | *                                    | 4.2?                          | **<br>(sow after<br>frosts)    | Low to<br>high?                         | Spring<br>temp<br>rising | Acid<br>sands to<br>heavy<br>clays                    | Limited testing, possible<br>option for eastern wheatbelt  |
| Kangaroo grass<br>( <i>Themeda triandra</i> )   |                  |  | Tufted                     | Seed                                   |  |                                       | *                     | None reported  | ***          | ****?             | *                       | **                        | *                                    |                               | **                             | Low to<br>high                          |                          |   | Native species, seed supply<br>limited   |
| Kikuyu<br>( <i>Pennisetum<br/>clandestinum</i> )  |                  | Whittet, Noonan  | Runners<br>and<br>rhizomes | Runners,<br>seed                       | 500 (400<br>south coast)   | 1 to 2                                | * <sup>1/2</sup>      | Low to moderate oxalates (see<br>above), generally safe, potential<br>nitrate poisoning, some reported<br>rumenitis, kikuyu poisoning<br>occasionally                            | ****         | **                | **                      | ***                       | **                                   | 4.0                           | ***                            | Low to<br>high                          | Spring<br>temp<br>rising | Sand and<br>loams                                     | Only on winter waterlogged or<br>summer moist soils in north,<br>all soils on south coast                      |
| Panic<br>( <i>Panicum maximum</i> )   |                  | Green (Petrie),<br>Gatton  | Tufted                     | Seed                                   | 600 (500<br>winter wet)<br>(425 south<br>coast)  | 2 to 5 or<br>1 to 3 in<br>mixtures    | * <sup>1/2</sup>      | Low to moderate oxalates (see<br>above), photosensitisation (stressed<br>plants)   | ****         | **                | *                       | **                        | *                                    | 4.3?                          | * to **<br>sow after<br>frosts | Moderate<br>to high                     | Spring<br>temp<br>rising | Sand,<br>loams<br>and light<br>clays                  | High quality feed under fertile<br>conditions<br>Has performed OK on some<br>poor sands                        |
| Paspalum<br>( <i>Paspalum dilatatum</i> )   |                  |  | Open tufted                | Short<br>rhizomes                      | 600  | 3 to 5                                | *                     | Nervous ergotism (ergot), paspalum<br>staggers   | ***          | **                | **                      | ***                       | *                                    | 4.3?                          | ***                            | High                                    | Spring                   | Heavy<br>clays and<br>wet areas                       | Wet sites with very good<br>autumn growth  |
| Purple pigeon grass<br>( <i>Setaria incrassate</i> )  |                  |  | Tufted                     | Seed                                   |  |                                       | *                     | Oxalates (see above)   | ***?         |                   |                         |                           |                                      |                               |                                | High                                    | Spring                   | Cracking<br>clay                                      | Failure in WA, possibly OK in<br>South Australia   |
| Rhodes grass<br>( <i>Chloris gayana</i> )<br>D=Diploid,<br>T=Tetraploid                     |                  | (T) Callide<br>(D) Katambora,<br>Pioneer, Topcut,<br>Finecut     | Tufted and<br>runners      | Runners,<br>seed                       | 425  | 1 to 2                                | * <sup>1/2</sup>      | None reported  | ****         | D***<br>T**       | **                      | ***                       | D***<br>T**<br>if not<br>waterlogged | 4.3                           | ** will<br>regenerate          | Low to<br>high                          | Spring<br>temp<br>rising | Sands to<br>medium<br>clays                           |  |
| Saltwater couch<br>( <i>Paspalum vaginatum</i> )  |                  |  | Rhizomes<br>and stolons    | Runners                                | Summer<br>moist  |                                       | *                     |  | ****         | **                | ***                     | ****                      | ***                                  |                               | ** to<br>***                   | Moderate<br>to high                     | Spring                   | Light to<br>medium                                    | Seepage and summer wet<br>areas  |
| Setaria<br>( <i>Setaria sphacelata</i> )  |                  |  | Tufted                     | Seed                                   | 550 (475<br>south coast)   | 1 to 2                                | * <sup>1/2</sup>      | Moderate to high oxalates (see above)  | ****         | **                | **                      | ***                       | *                                    |                               | * to<br>***                    | Low to<br>high                          | Spring                   | Sands to<br>loams                                     |  |
| Signal grass<br>( <i>Urochloa decumbens</i> )   |                  | Basilisk   | Tufted                     |  | 500 (450<br>south coast)   | 1 to 2                                | *                     | Low oxalates - generally OK (see<br>above), photosensitisation   | ****         | **                | **                      | **                        | *                                    | 4.0                           | *                              | Low to<br>high                          | Spring                   | Sands to<br>loams                                     |  |
| Windmill grass<br>( <i>Chloris truncata</i> )   |                  |  | Small tufted               | Seed, short<br>stolons                 |  |                                       | *                     | None reported  | ****?        | **                |                         |                           |                                      |                               | **                             | Low to<br>high                          |                          | Sands to<br>clays                                     | Native species – short-lived<br>perennial (2-3yr) - prolific<br>seeder in wet summers                          |

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