

Weed fast facts

**Information on common pasture weeds
to support management decisions**

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MLA acknowledges the matching funds provided by the Australian Government to support the research and development detailed in this publication.

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- 3. Interventions 31



Erodium (*Erodium spp.*)

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Weed fast facts is an information guide on 15 different common pasture weeds to support management decisions. The purpose of *Weed fast facts* is to:

- help you understand how weeds grow
- identify the problems weeds cause
- outline weeds' benefits in terms of their contribution to feed available for grazing
- provide facts on interventions and when tactics should be implemented.

Information on each weed is presented in three wheels: growth, grazing value, and interventions. The wheels are based around a monthly calendar, which represents the cyclical nature of plant growth.

Growth wheel

The growth wheels provide a visual of the weed's life cycle over the year. It illustrates how the weed grows, the conditions that favour its growth and its likely causes to help reduce its presence and achieve long-term control.

Grazing value wheel

A weed's benefit is its contribution to the quantity and quality of feed available for grazing. The grazing value wheel shows the feed quality the weed provides during its lifecycle and facts related to palatability and potential toxicity. In most cases, unless the weed is toxic, weeds provide good nutritional value during their vegetative growth stage (prior to flowering). More information on feed quality terms and what the numbers mean is on page 6.

Intervention wheel

Intervening to remove the weed requires knowledge of the tactics that can be used to control the weeds. These are shown in the intervention wheel calendar. Additional facts to consider for achieving long-term control are also provided.

Together, this information can help you decide what action to take. Weed control decisions require appreciating and comparing the benefits and costs, and pros and cons of both the weed and its interventions.

Navigating *Weed fast facts*

This document contains hyperlinks that allow you to move to each weed or wheel you are interested in viewing. In the main menu, hover your cursor over the weed or wheel you wish to view. The cursor changes to a hand, click and you will be taken to this section.

To move between wheels of growth, grazing value or interventions for a selected weed, hover your cursor on the wheel you wish to view, when the cursor changes to a hand, simply click and you will be taken to that wheel. From individual weed wheels, you can return to the main menu by clicking on its name, which is located on the top right-hand side. In the grazing value wheel, 'about feed quality' is also hyperlinked, which is located at the bottom right-hand page side.

About feed quality information

[Main menu](#)

The feed quality information relates only to the grazeable component of the weed species which were sampled on a monthly basis. Information was tested through FeedTest operated by Agrifood Technology Pty Ltd, Werribee. Refer to their website for information on test procedures.

Abbreviations used within the document are:

DM = Dry matter (%)

ME = Metabolisable energy (MJ ME/kg DM)

DDM = Digestibility (%)

CP = Crude protein (%)

The ranges of feed quality used within weed facts are found in tables 1, 2 and 3, with a description of their dietary value and impact on animal production.

Table 1. Weed dry matter (%) ranges and their dietary value

Dry matter % ranges	Dietary value
< 10%	Lush weed, excessive water content, insufficient fibre, results in loose, runny faeces
10 - 15%	Short leafy weed, very high water content, sufficient fibre
15 - 20%	Leafy weed, high water content, sufficient fibre
20 - 30%	Vegetative weed, high water content, sufficient fibre
30 - 50%	Stemmy weed, moderate water content, fibre levels increasing, reduced intake
50 - 80%	Mature weed, low water content, high fibre, lowered intake
> 80%	Aged weed, very low water content, very high fibre, substantially reduced intake

Table 2. Weed digestibility % and ME (MJ/ME/kg DM) ranges and their dietary value

Digestibility % ranges	ME ranges	Dietary value
> 80%	> 12	Very high quality, fastest rate of digestion and highest intake
75 - 80%	11 - 12	High quality, rapid rate of digestion, sufficient intake
65 - 75%	9 - 11	Moderate quality, rate of digestion, some reduced intake
50 - 65%	7.5 - 9	Poor quality, slow digestion, lowered intake
45 - 50%	5.5 - 7.5	Very poor quality, very slow digestion, substantially reduced intake

Table 3. Crude Protein (%) ranges and their dietary value

Crude protein % ranges	Dietary value
> 20%	Very high, would meet all animal demands for high protein
15 - 20%	High, would meet all weaner demands for high protein
10 - 15%	Moderate, meet lactation demands
6 - 10%	Low, support only dry stock demands
<6%	Very low, does not meet animal demands

Click on the below to return to each weed's grazing value

[Annual ryegrass](#)

[Soft brome grass](#)

[Winter grass](#)

[Fat hen](#)

[Onion grass](#)

[Barley grass](#)

[Bent grass](#)

[Capeweed](#)

[Flatweed](#)

[Sow thistle](#)

[Silver grass](#)

[Fog grass](#)

[Erodium](#)

[Goosefoot](#)

[Wireweed](#)

Dry matter (DM) is the percentage of feed remaining if all the water was removed. The dry matter is the important component as it contains the energy and protein needed for growth and maintenance and allows feed value comparison across a range of weed species. DM ranges from very low at less than 10% during winter and when the plant is vegetative and greater than 80% following reproductive growth when it becomes dry and brittle. DM also contains fibre which increases as plants mature and dry off.

Digestibility (DDM) is an estimate of the percentage of the dry matter which is retained by the grazing animal for growth and maintenance. For example, 80% digestibility would mean 80% of the DM is used for growth and 20% is not used and would be excreted as waste products dung, urine and methane. Low digestibility in the rumen means feeds must be retained for prolonged periods to be ruminated and digested by microbes. This slow emptying of the rumen causes the rumen to become distended and causes the animal to reduce its feed intake. As animals may only ruminate for up to 13 hours per day, the animal may run out of time to meet its daily intake requirements. Weed digestibility ranges are from less than 50% to greater than 80%. High quality feed is regarded as greater than 75% and poor quality less than 65%.

Metabolisable energy (ME) is the energy contained in the weeds and is calculated from determination of the digestibility of the organic dry matter through the following equation: $ME = 0.17 \text{ DDM}\% - 2.0$. Daily energy requirements of stock classes are well documented. A dry sheep equivalent (DSE), e.g. 50kg dry sheep condition score 3 requires 8 MJ of ME per day for maintenance. A weed with ME below 9 would be considered poor quality and high quality would be above 11 MJ/kg DM.

Crude protein (CP) is the total protein in a feed and provides the animal with a source of nitrogen. Dry (non-lactating), lactating and growing livestock have different requirements for CP as shown in Table 3. Green weeds are generally not limited in protein and any excess protein is converted to ammonia where it is used by rumen bacteria and the rest excreted in urine. Energy is needed to rid the body of excess ammonia which can cause issues if energy requirements are not met. When protein content of dry weeds fall below 6% during summer, stock struggle to digest feed as the rumen micro-organisms lack a nitrogen source (i.e. ammonia) to break down cellulose.

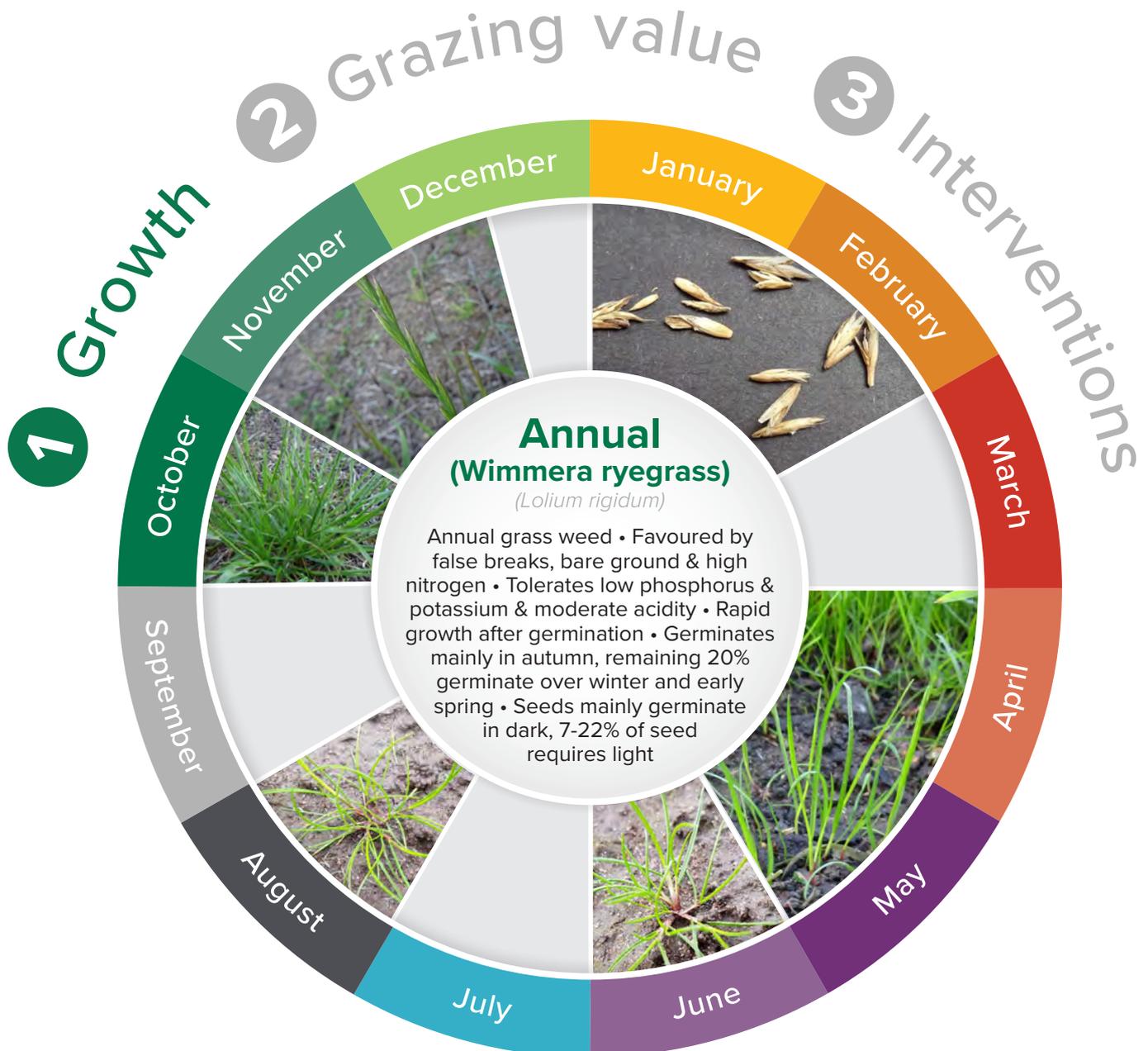
Annual (wimmera ryegrass)

Lolium rigidum

Main menu

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To access the information on each layer, simply click on the relevant layer's number below.



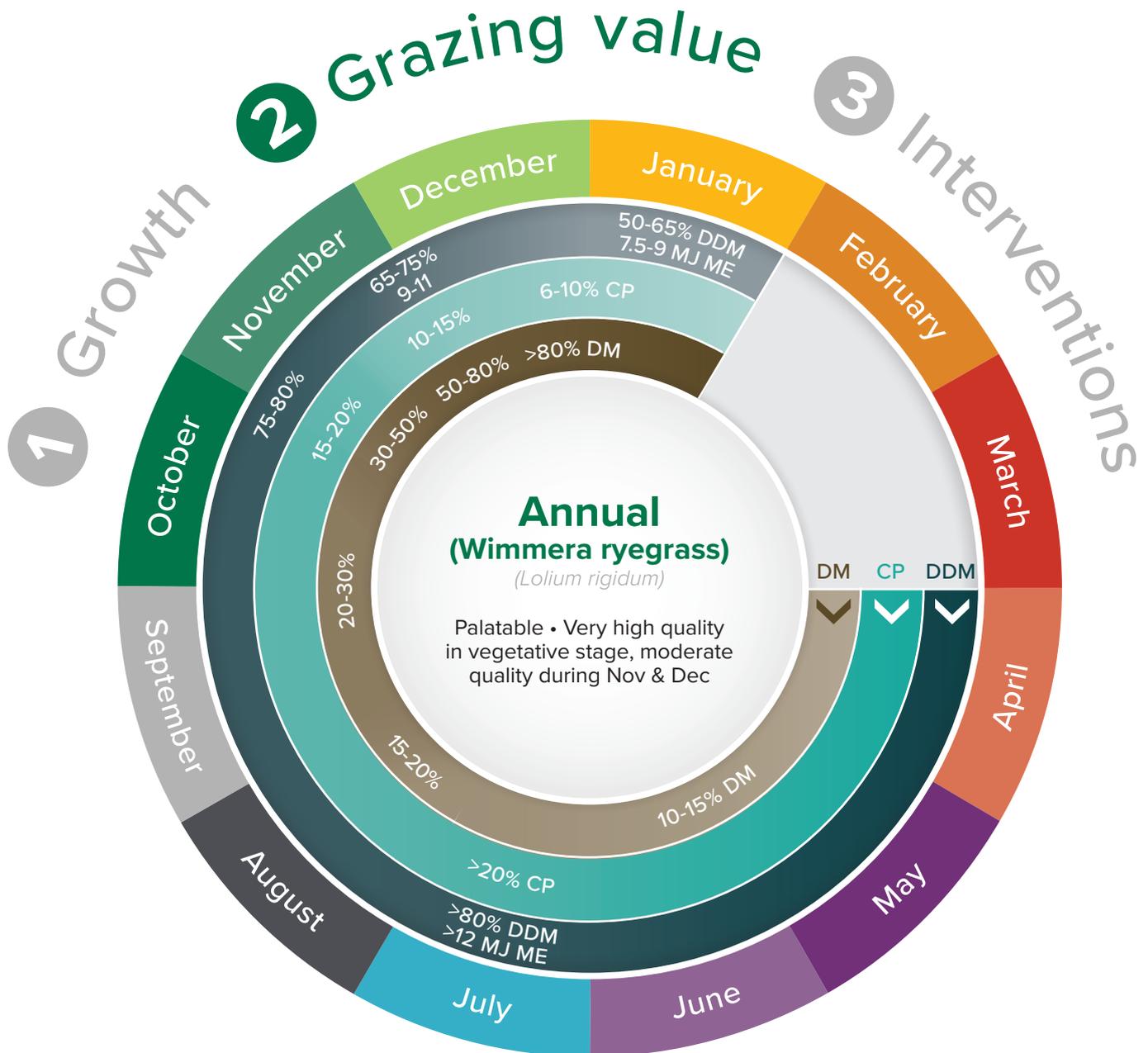
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Lolium rigidum

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DM • Dry matter

CP • Crude protein

DDM & ME • Digestibility and metabolisable energy

[About feed quality information](#)

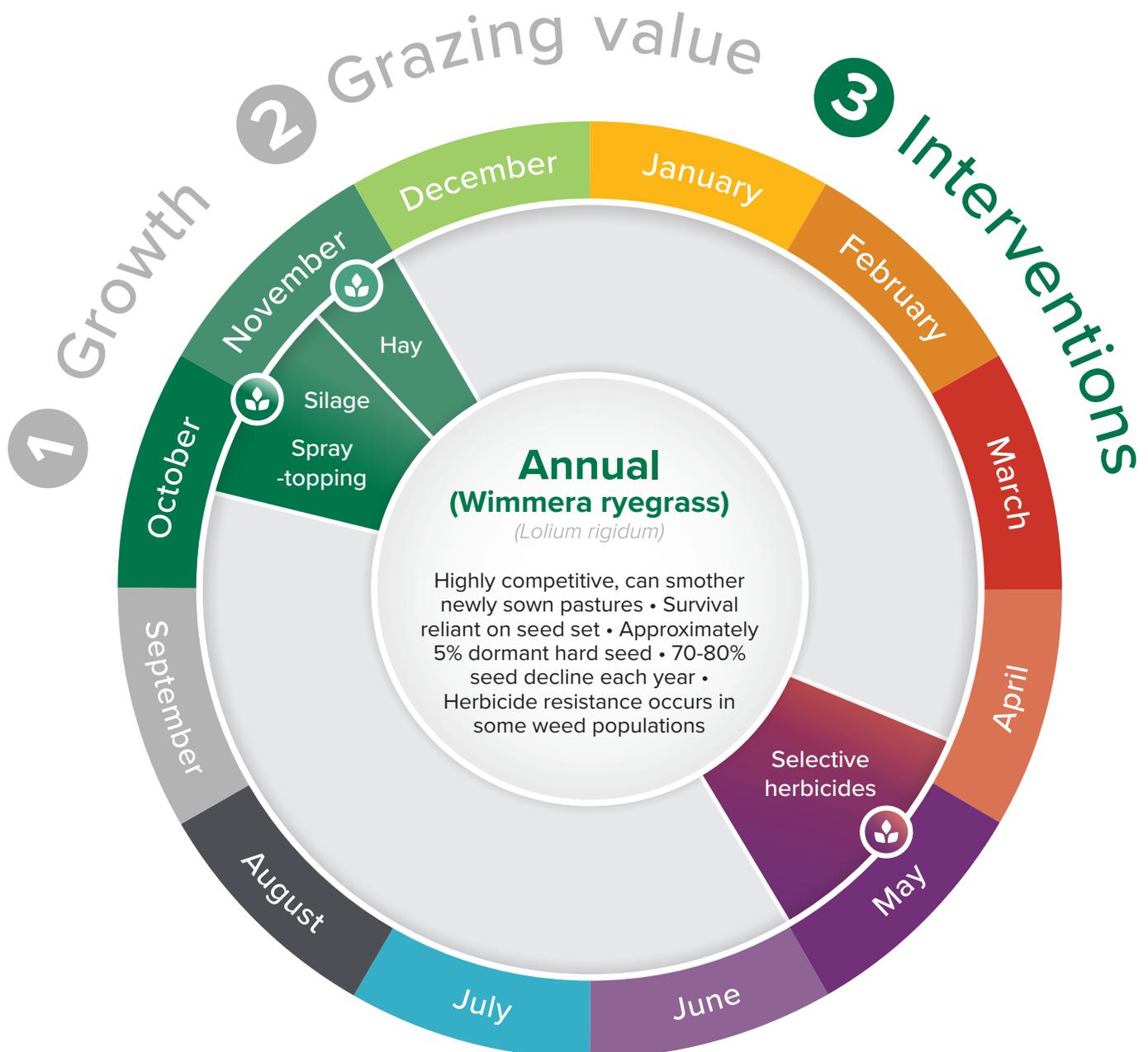
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Barley grass

Hordeum leporinum

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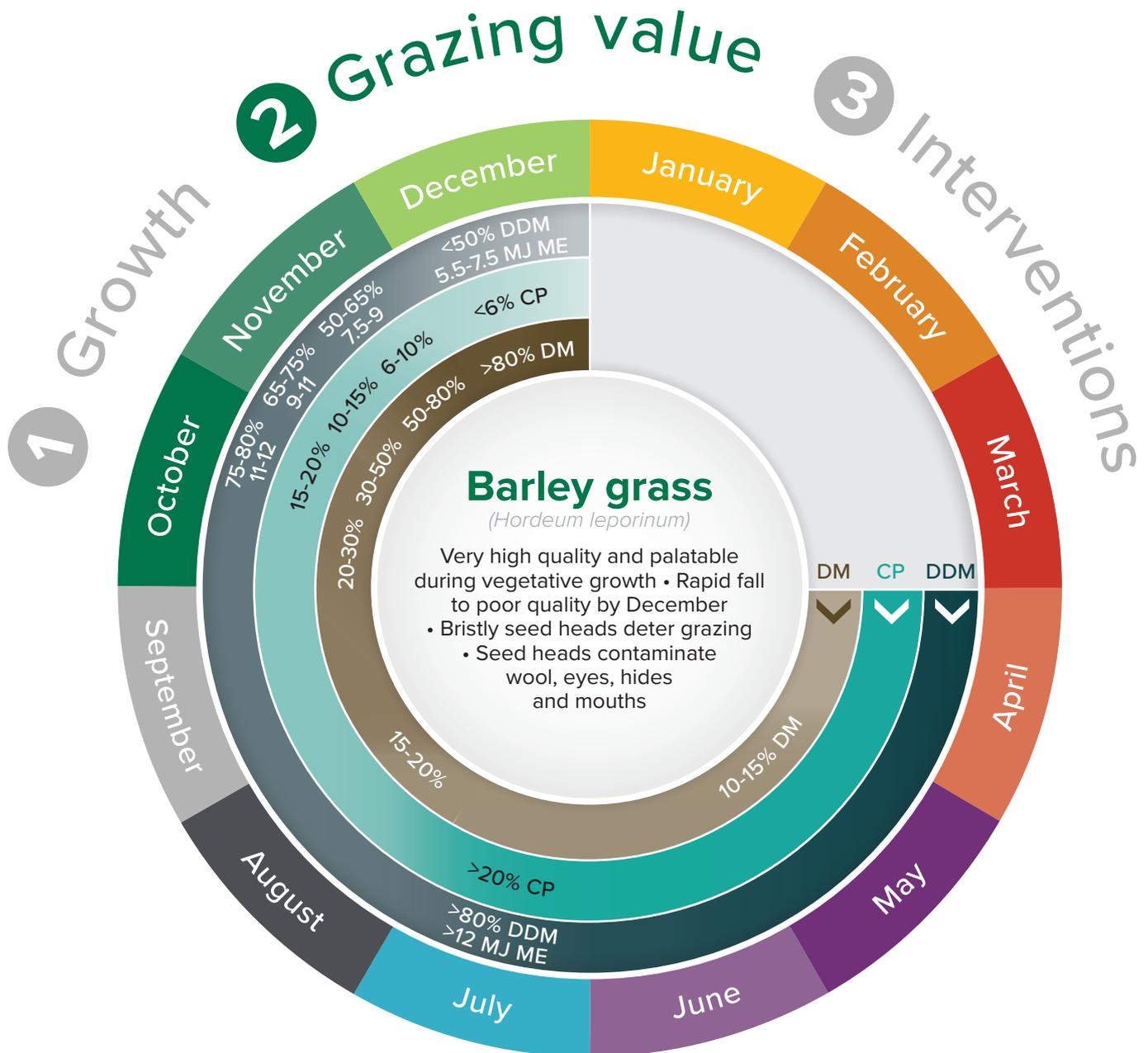
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Hordeum leporinum

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About feed quality information

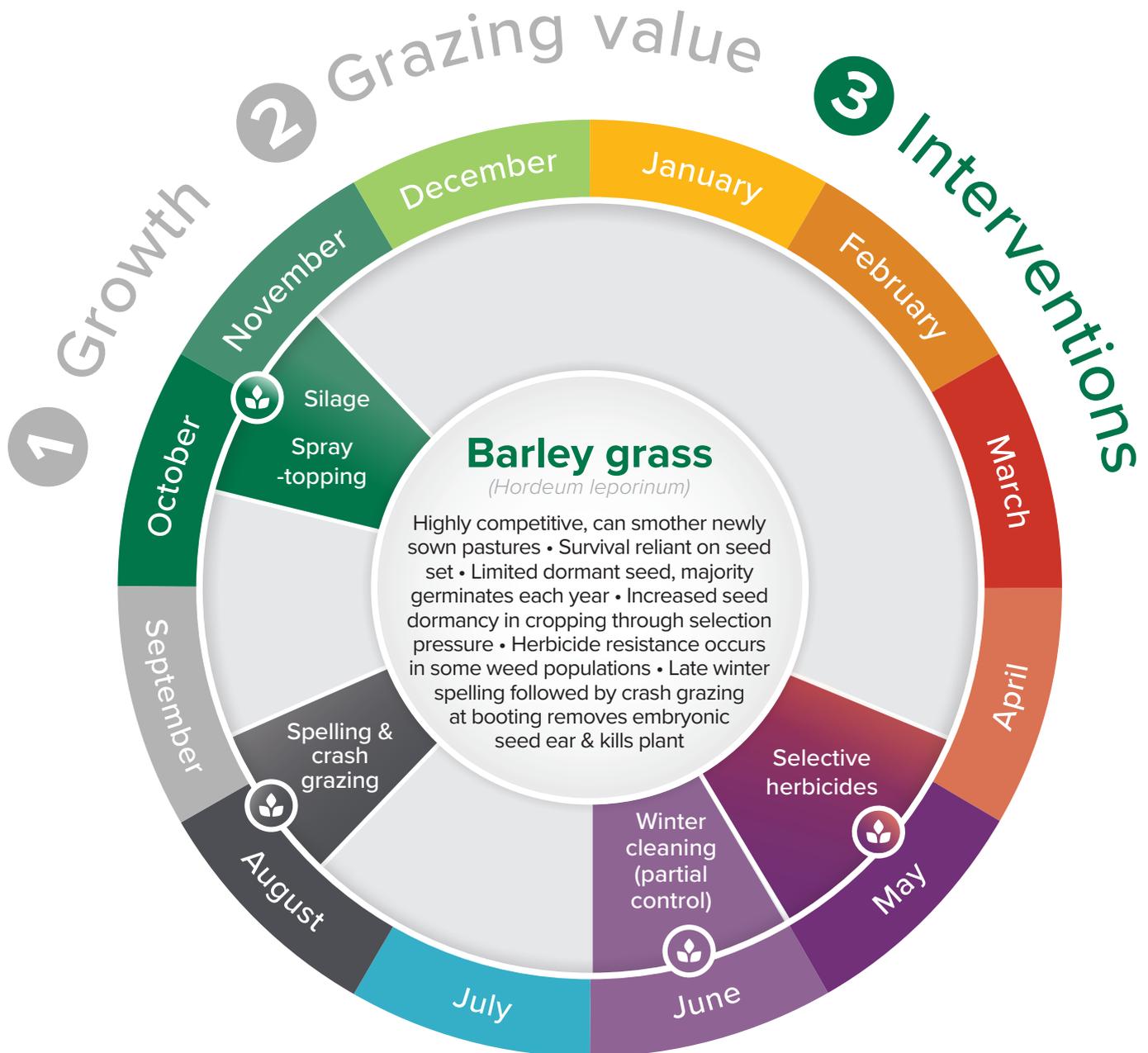
Barley grass

Hordeum leporinum

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Silver grass

Vulpia spp.

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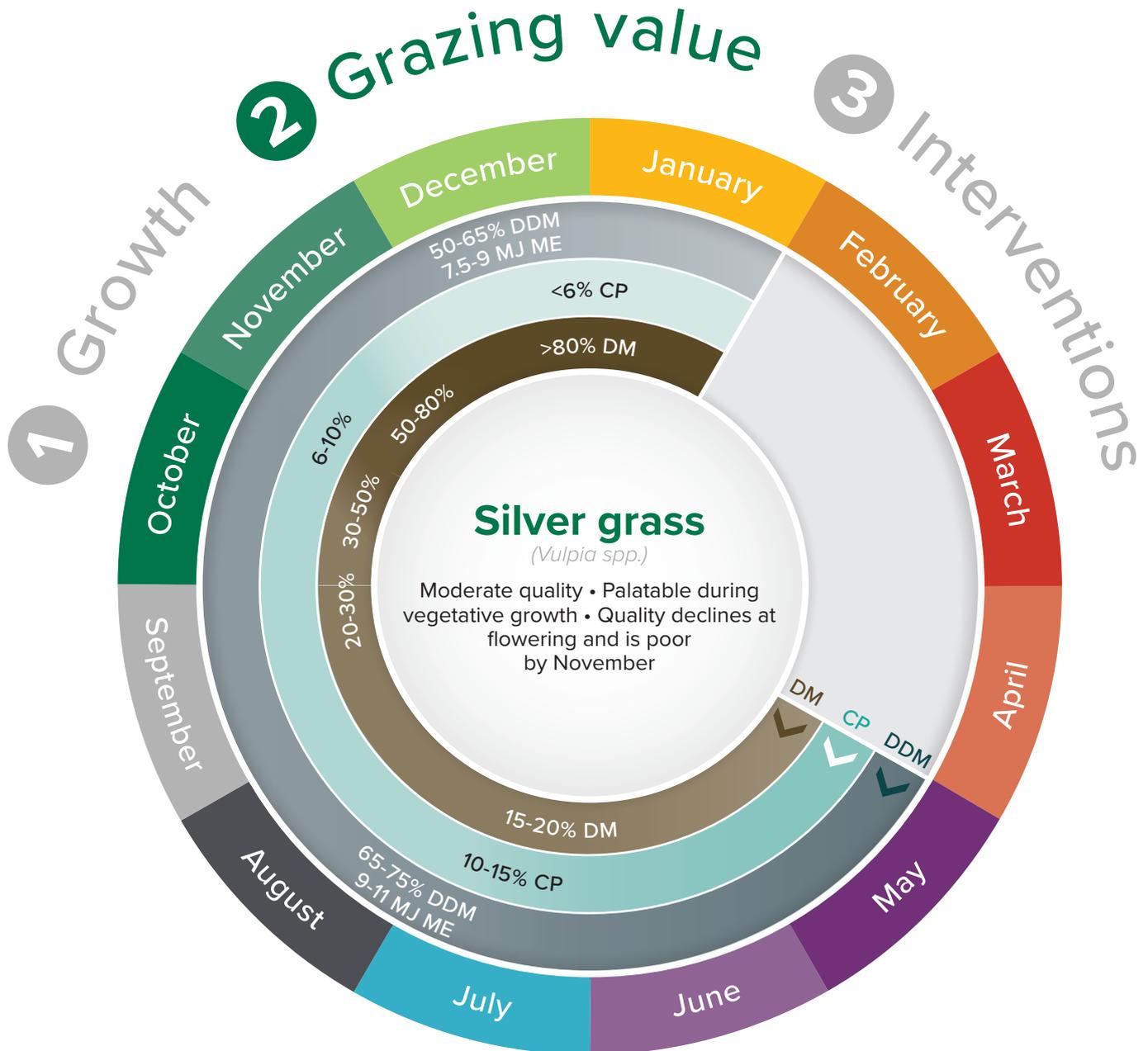
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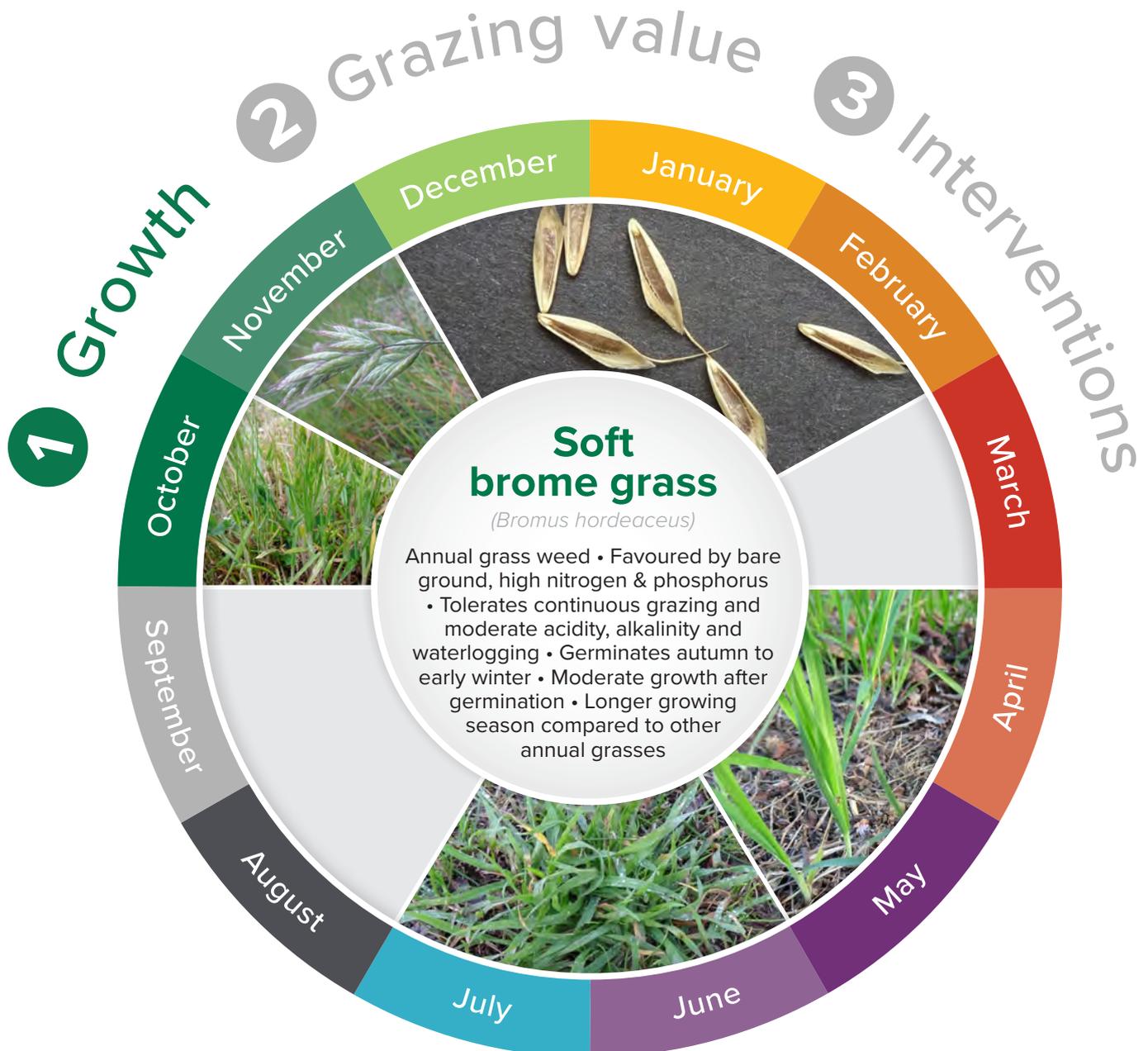
Soft brome grass

Bromus hordeaceus

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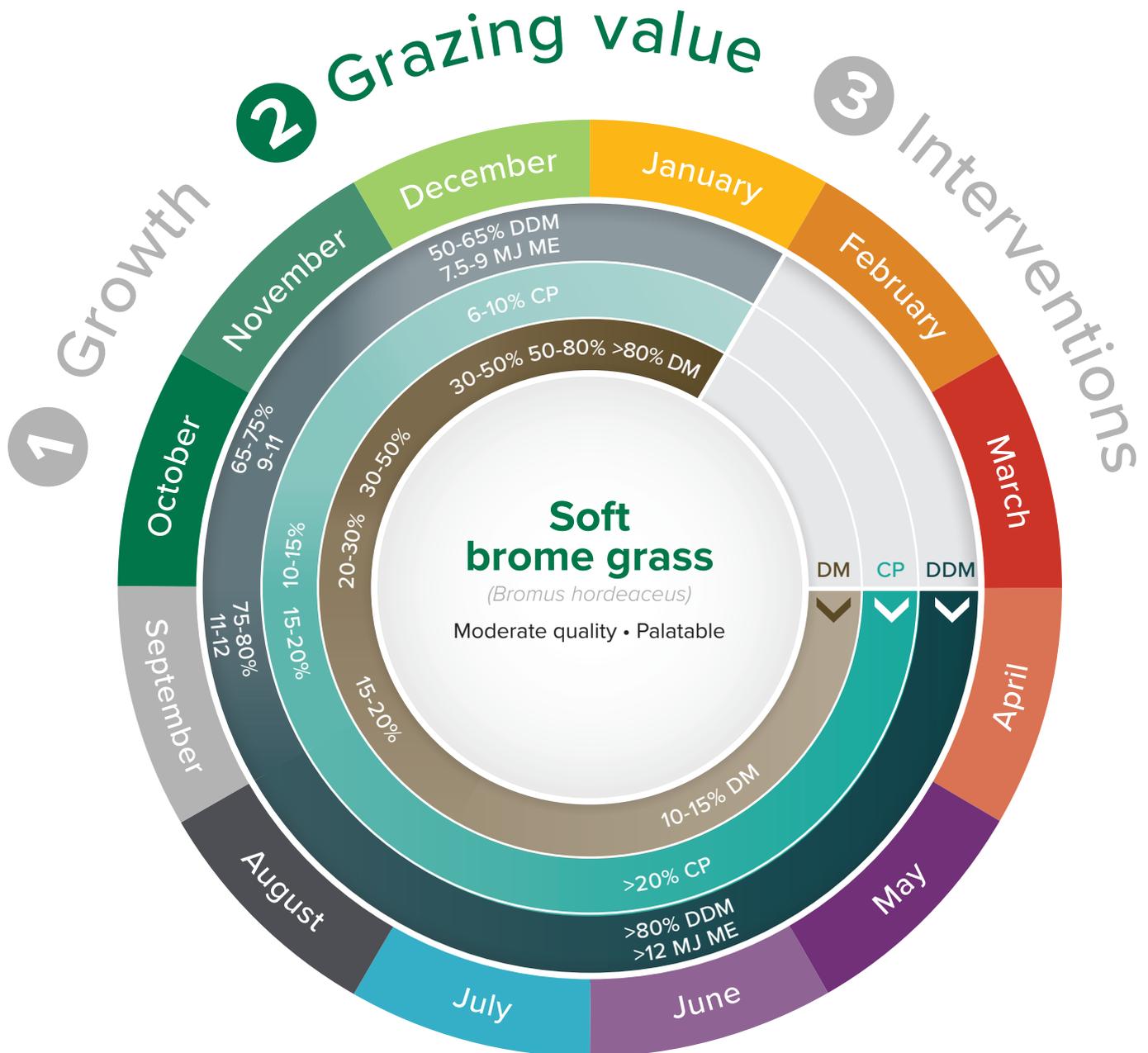
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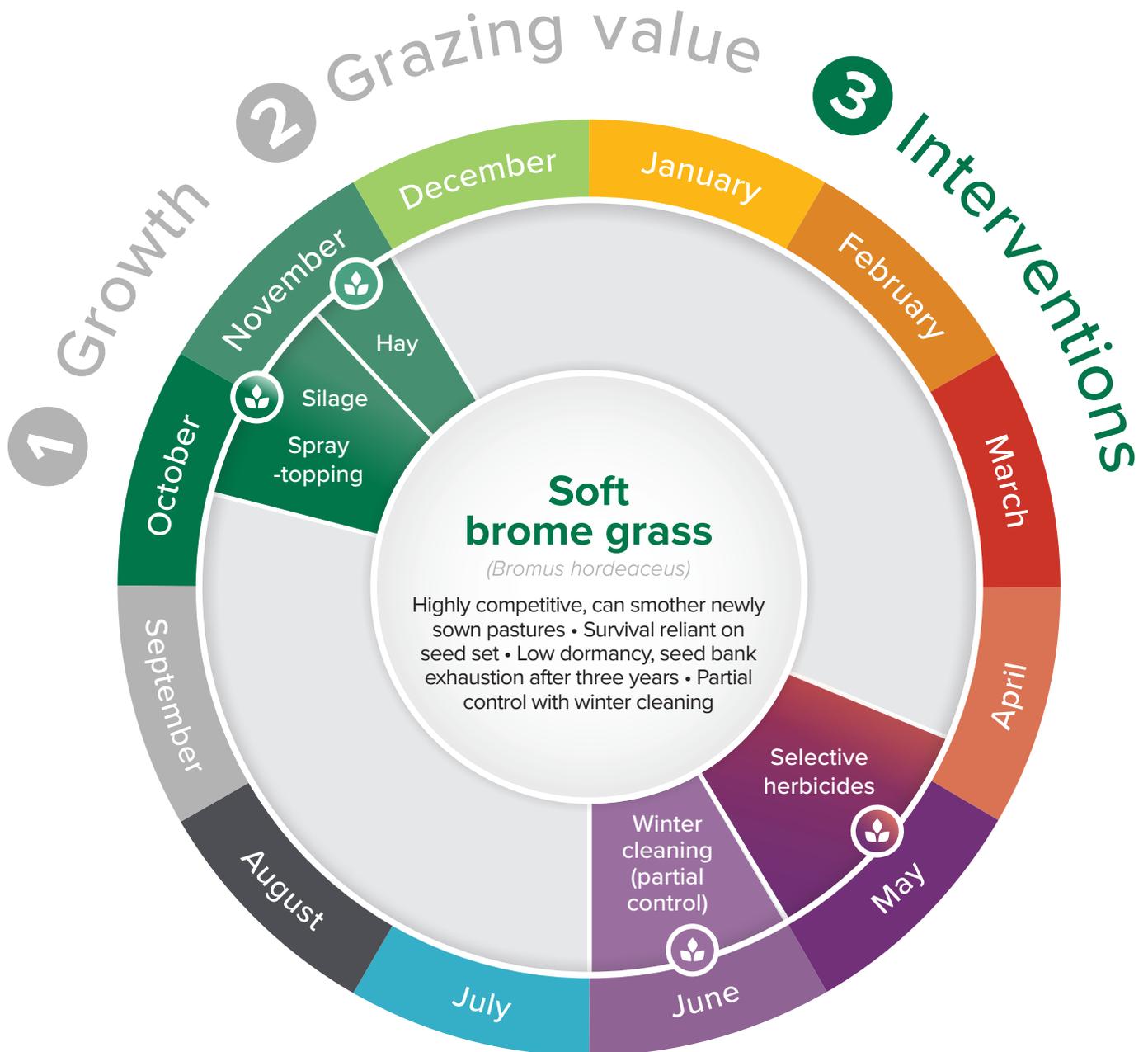
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Bent grass

Agrostis spp.

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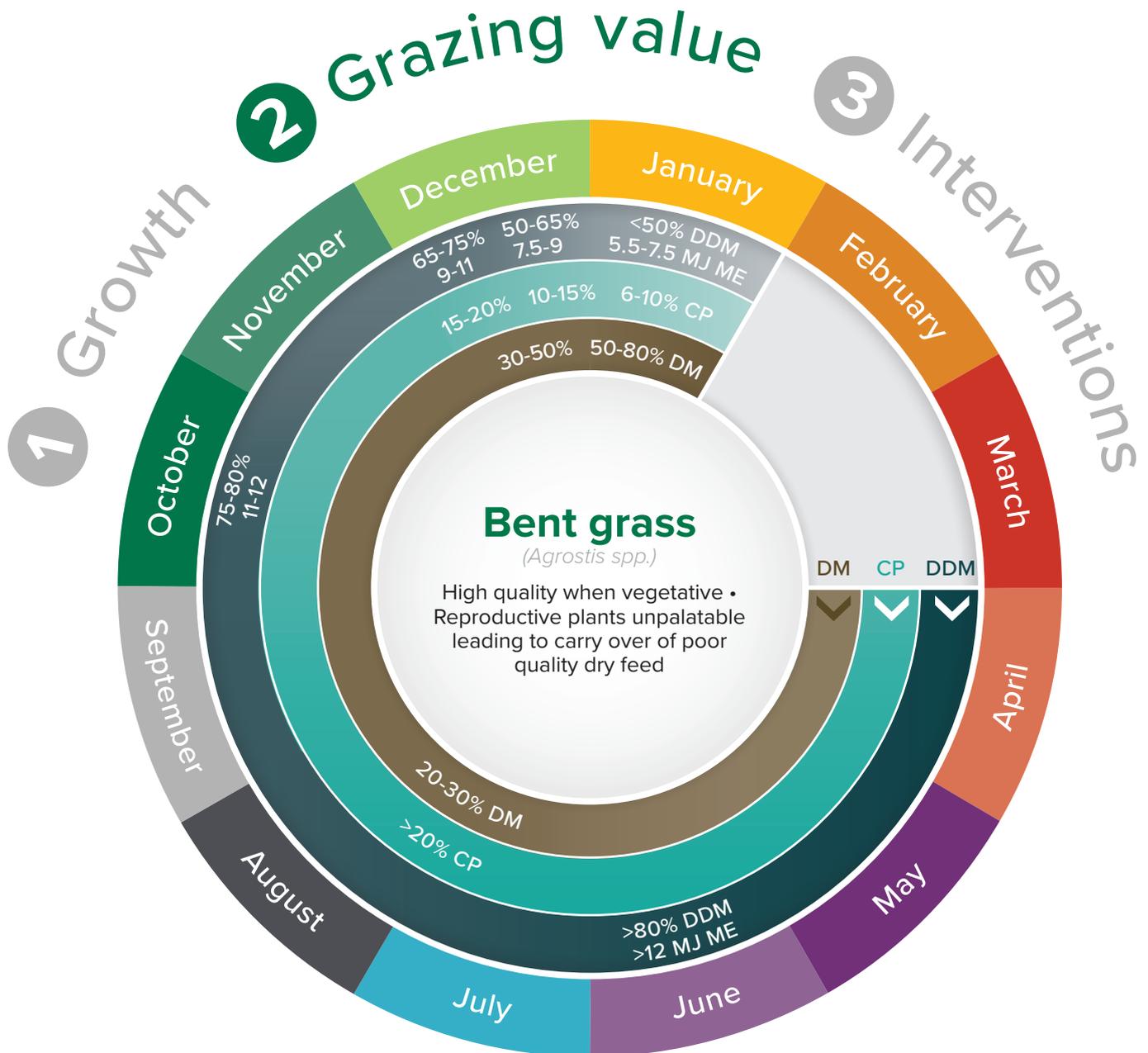
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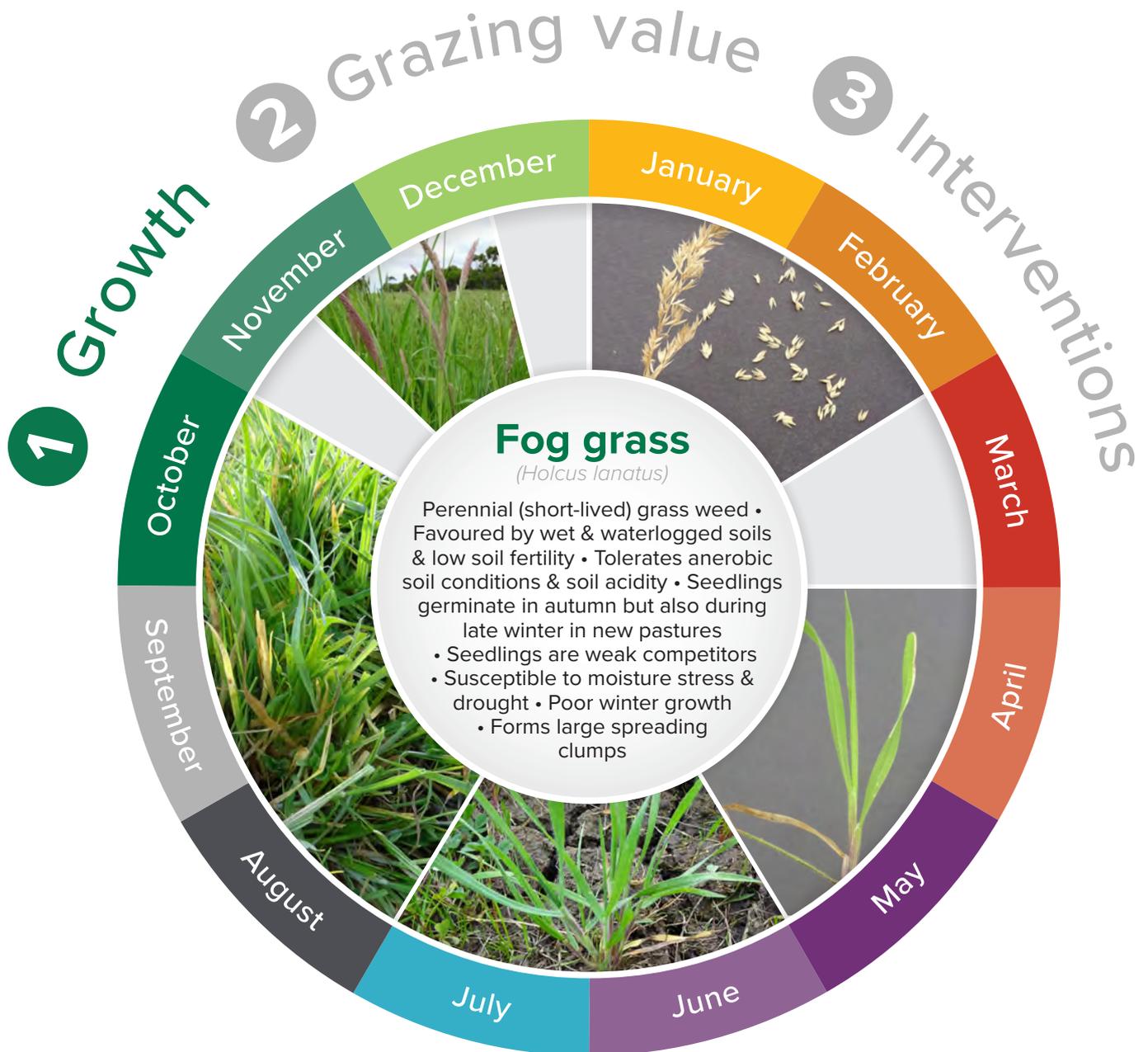
Fog grass

Holcus lanatus

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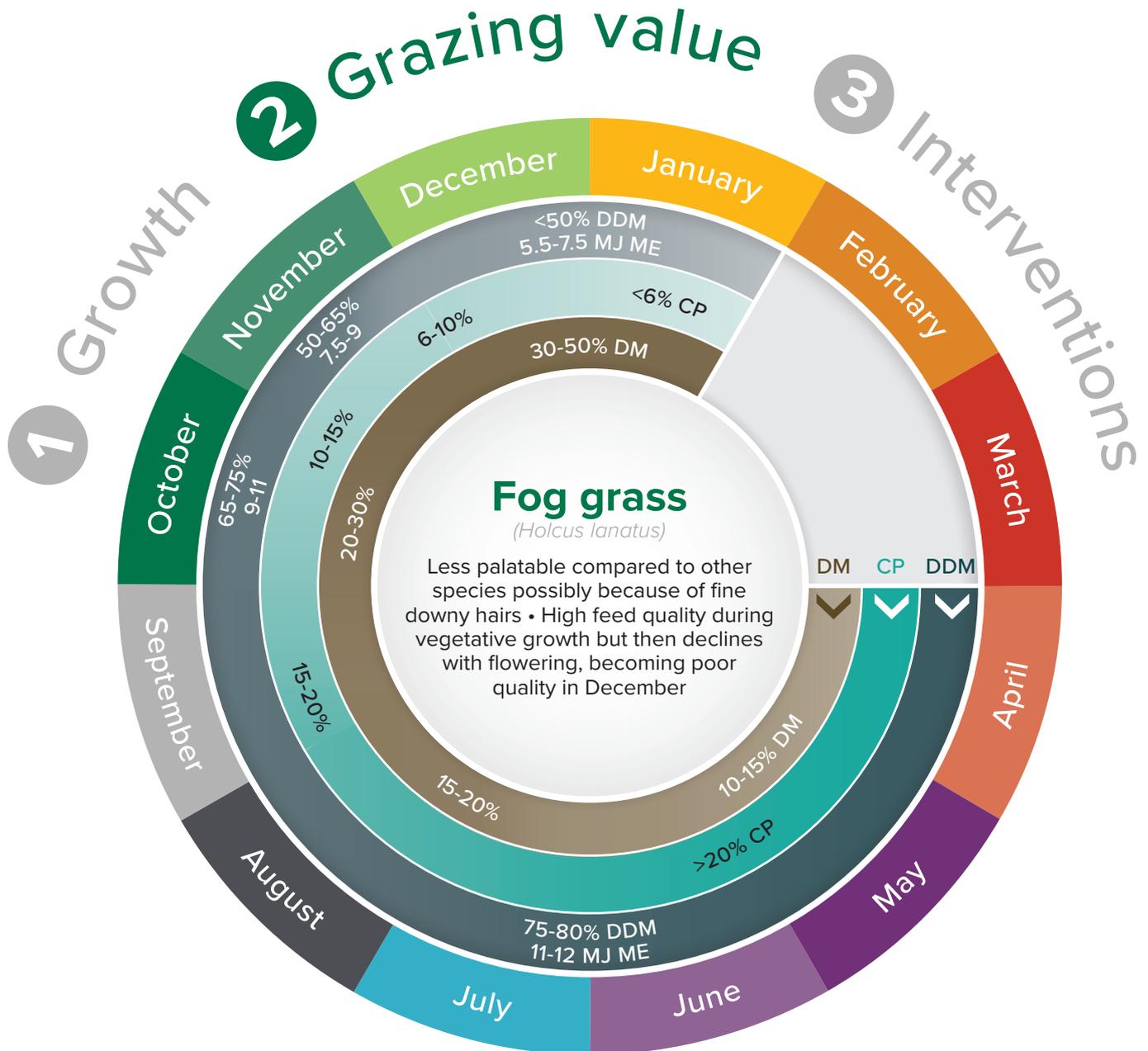
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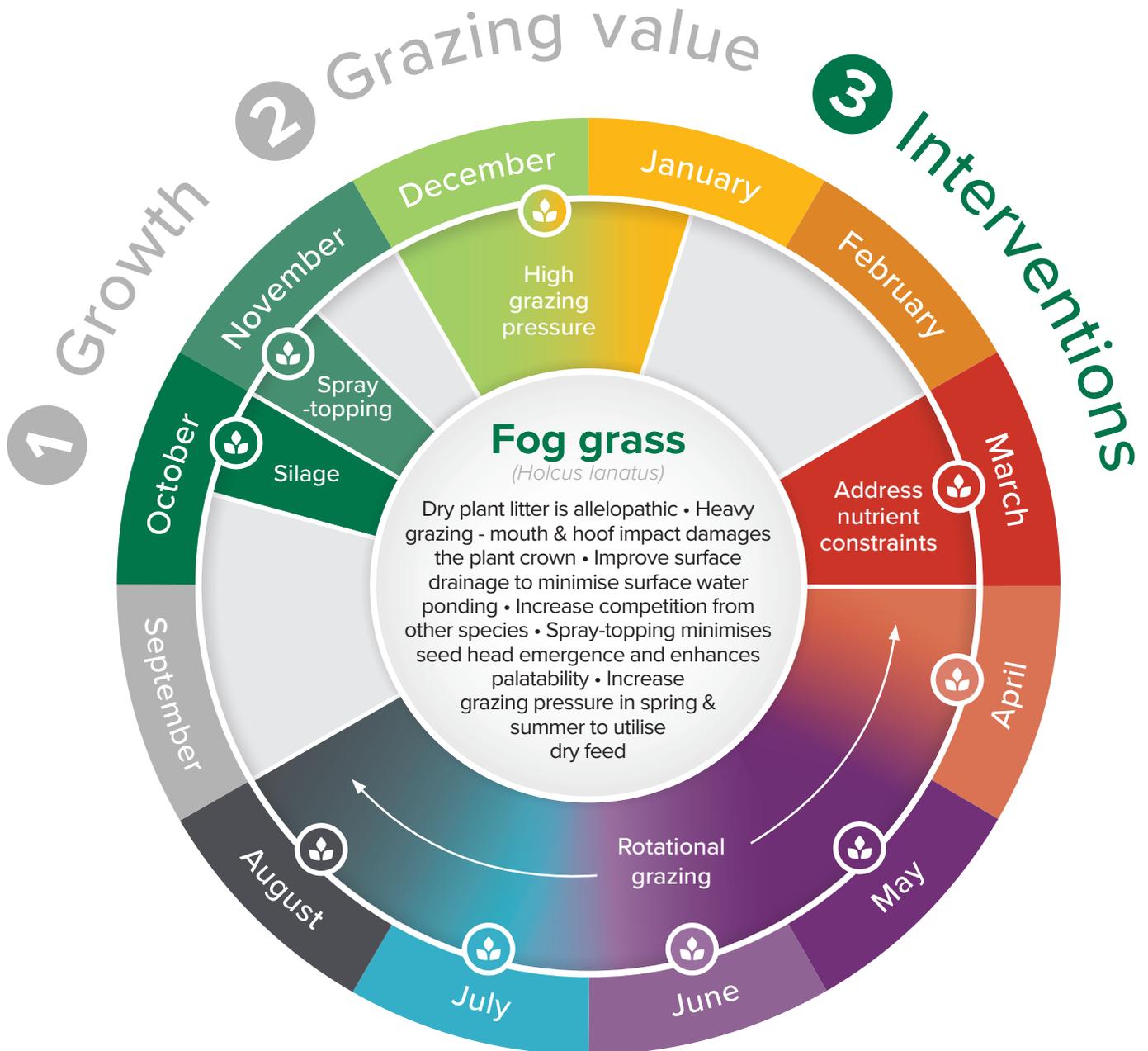
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Winter grass

Poa annua

Main menu

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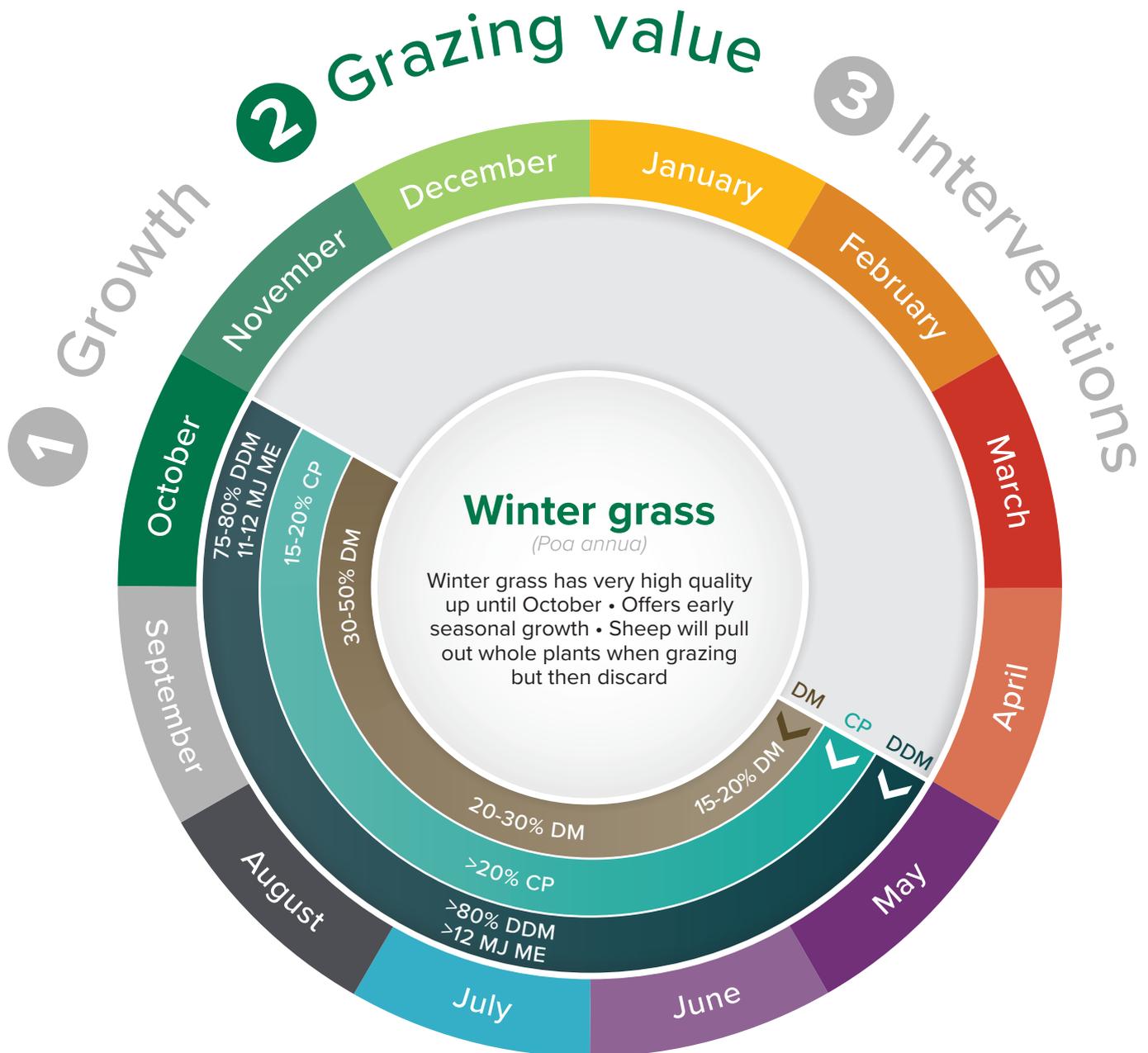
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About feed quality information

Winter grass

Poa annua

Main menu

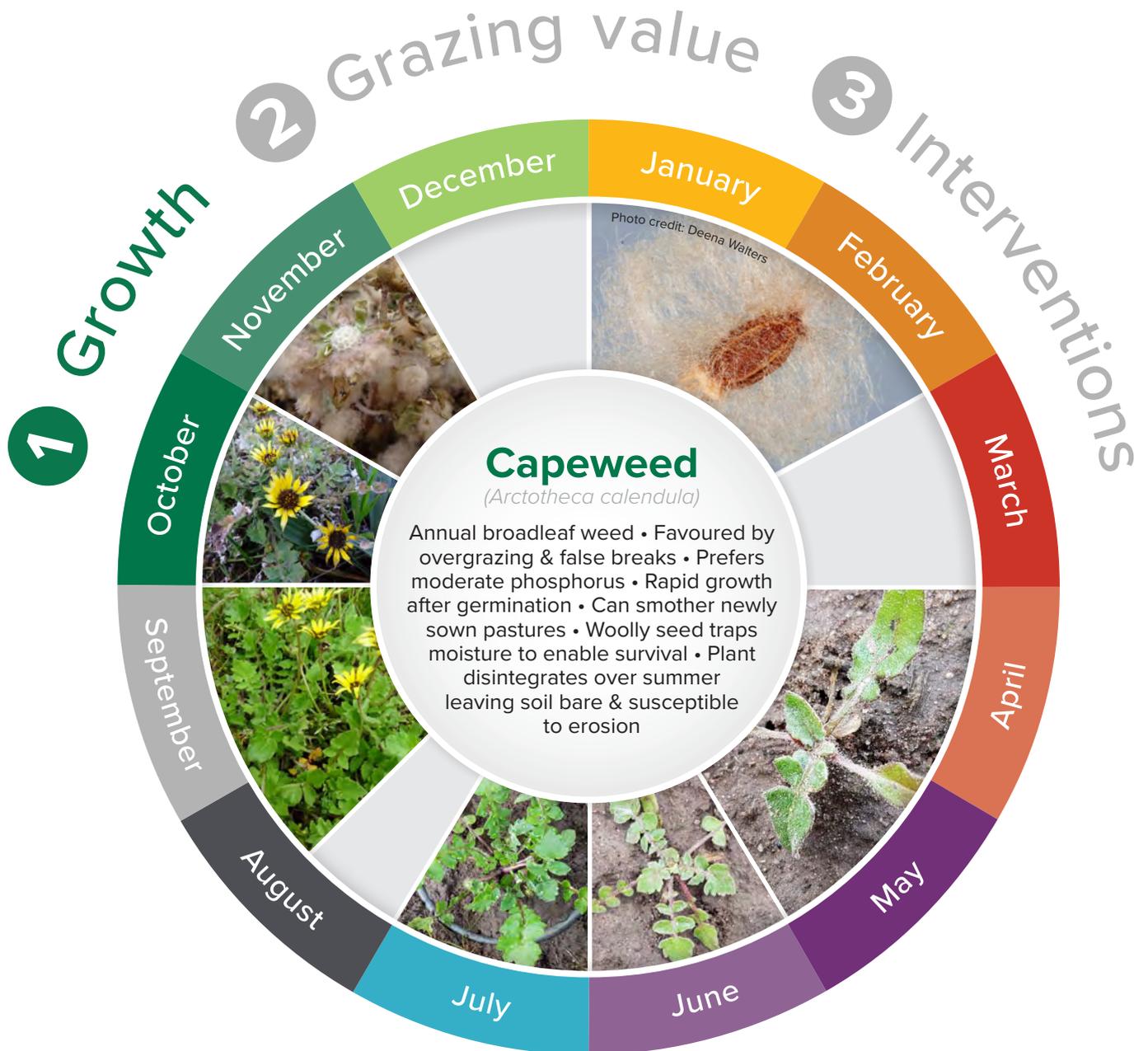
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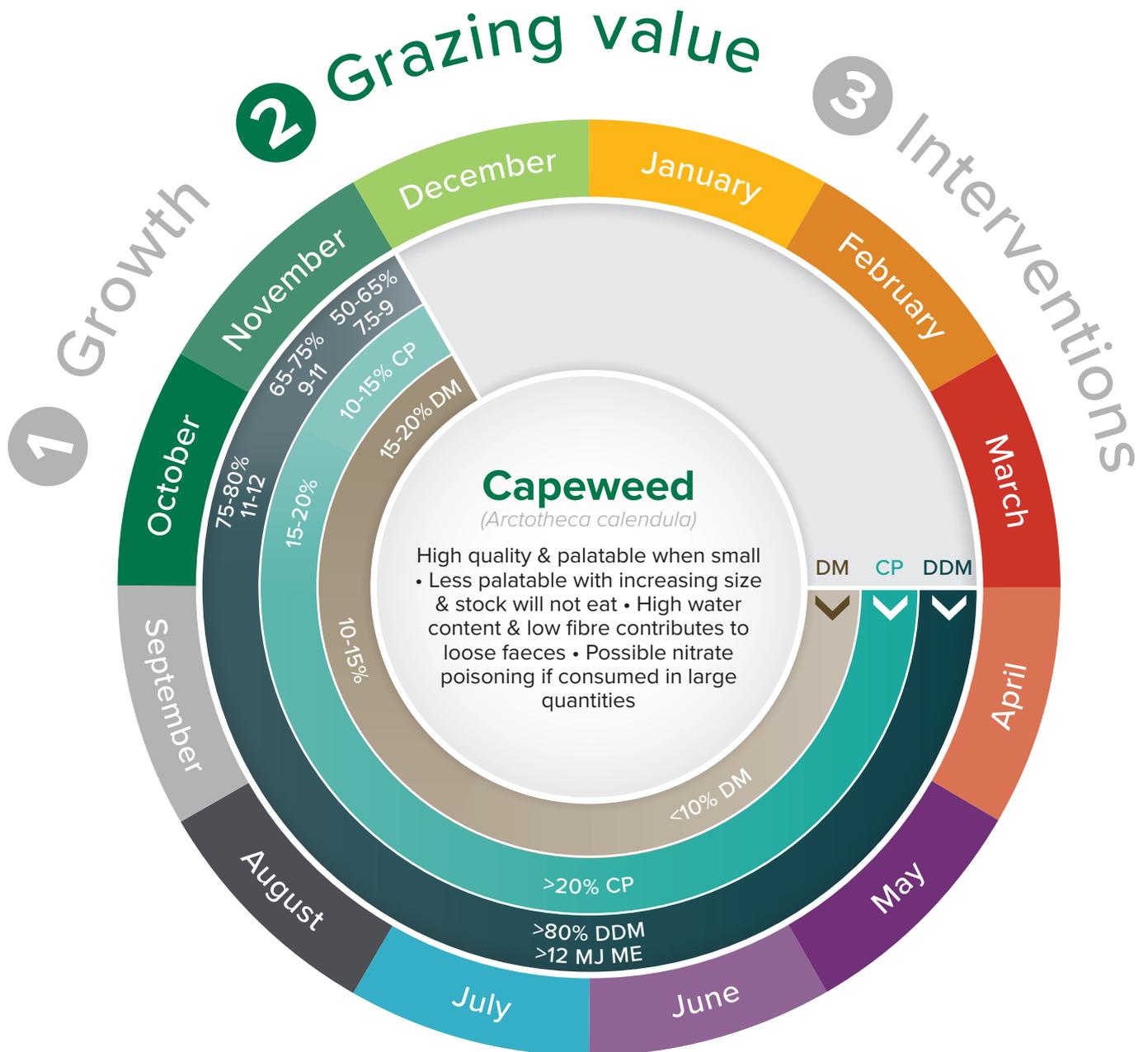
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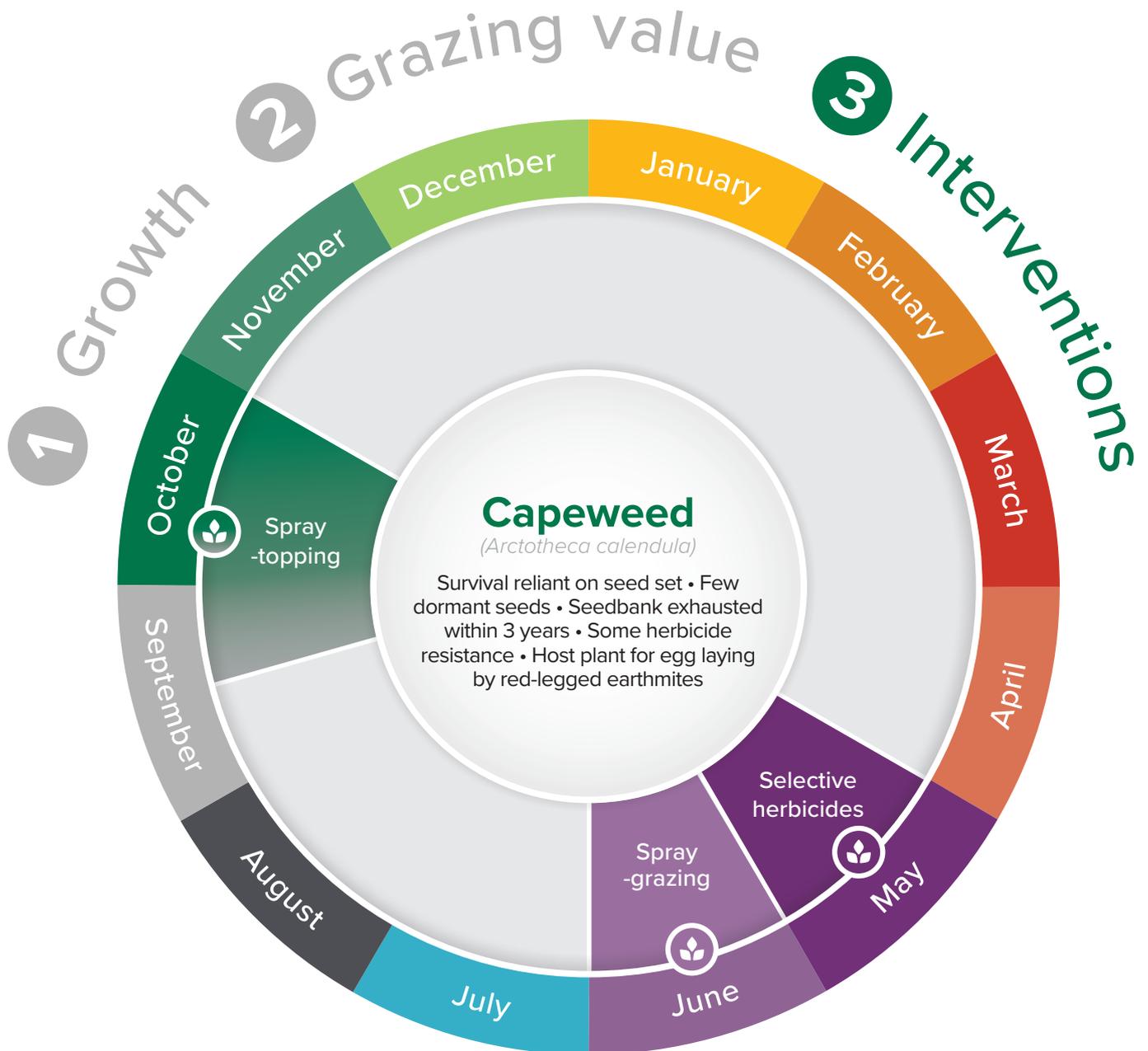
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Erodium

Erodium spp.

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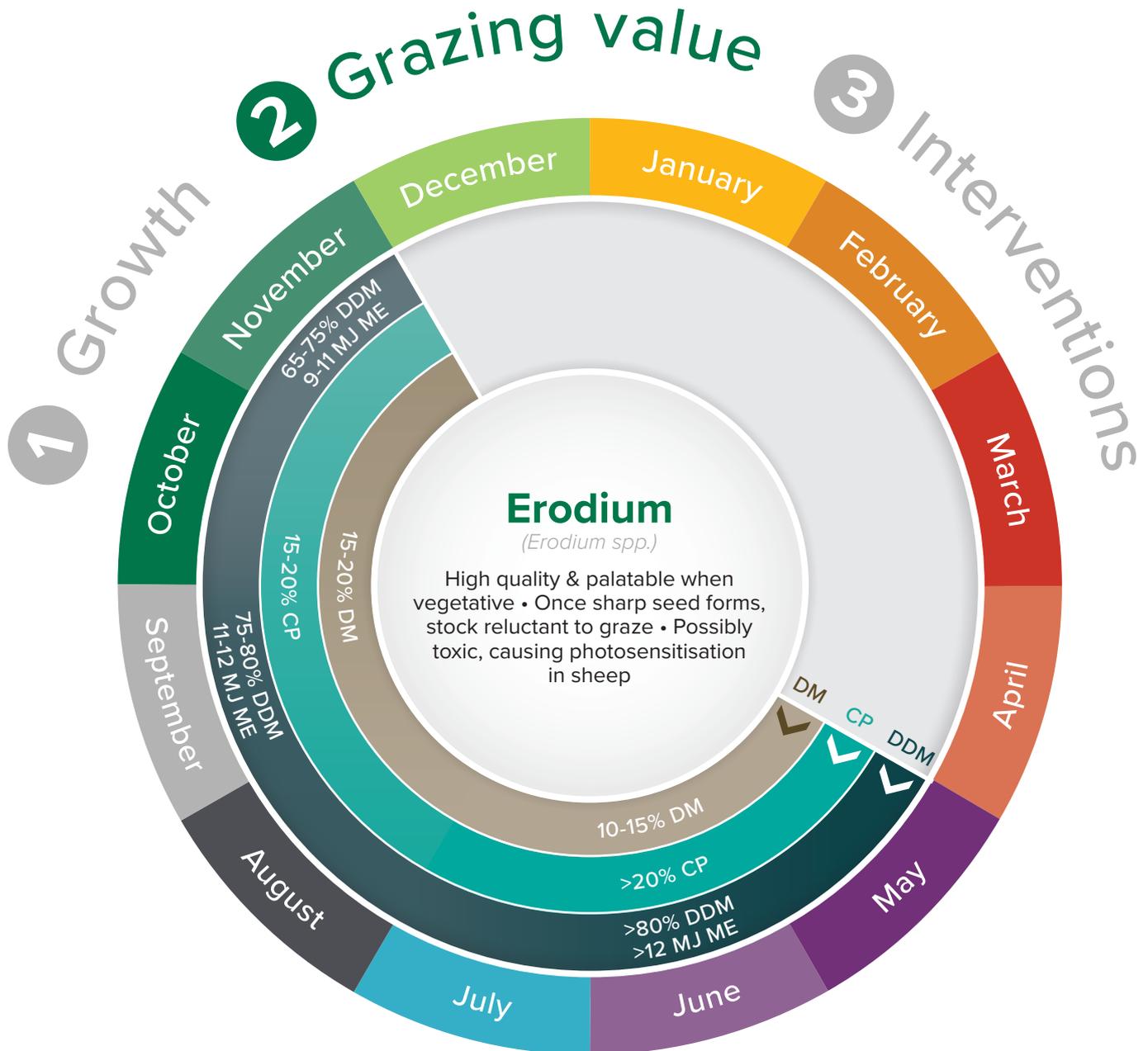
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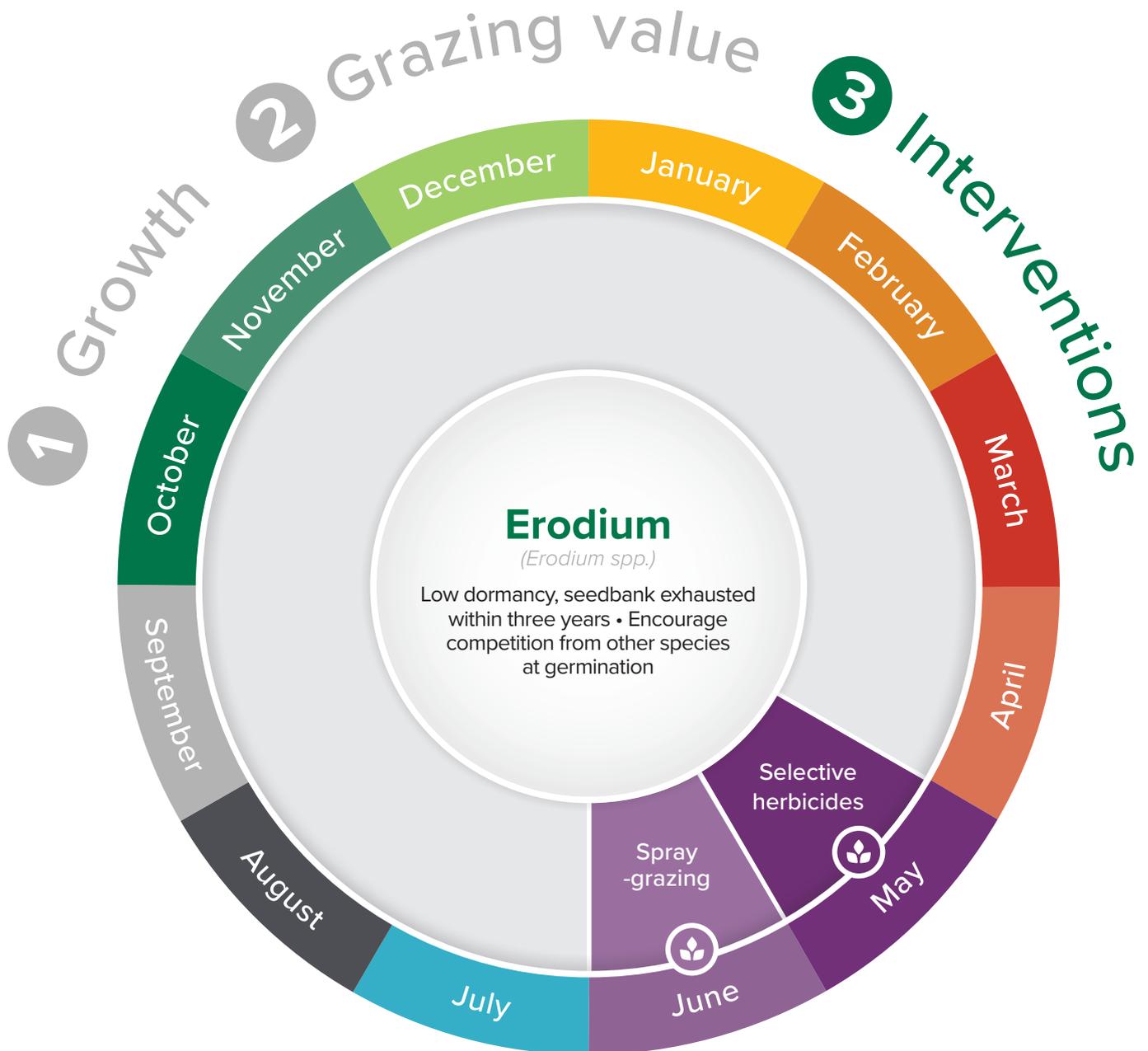
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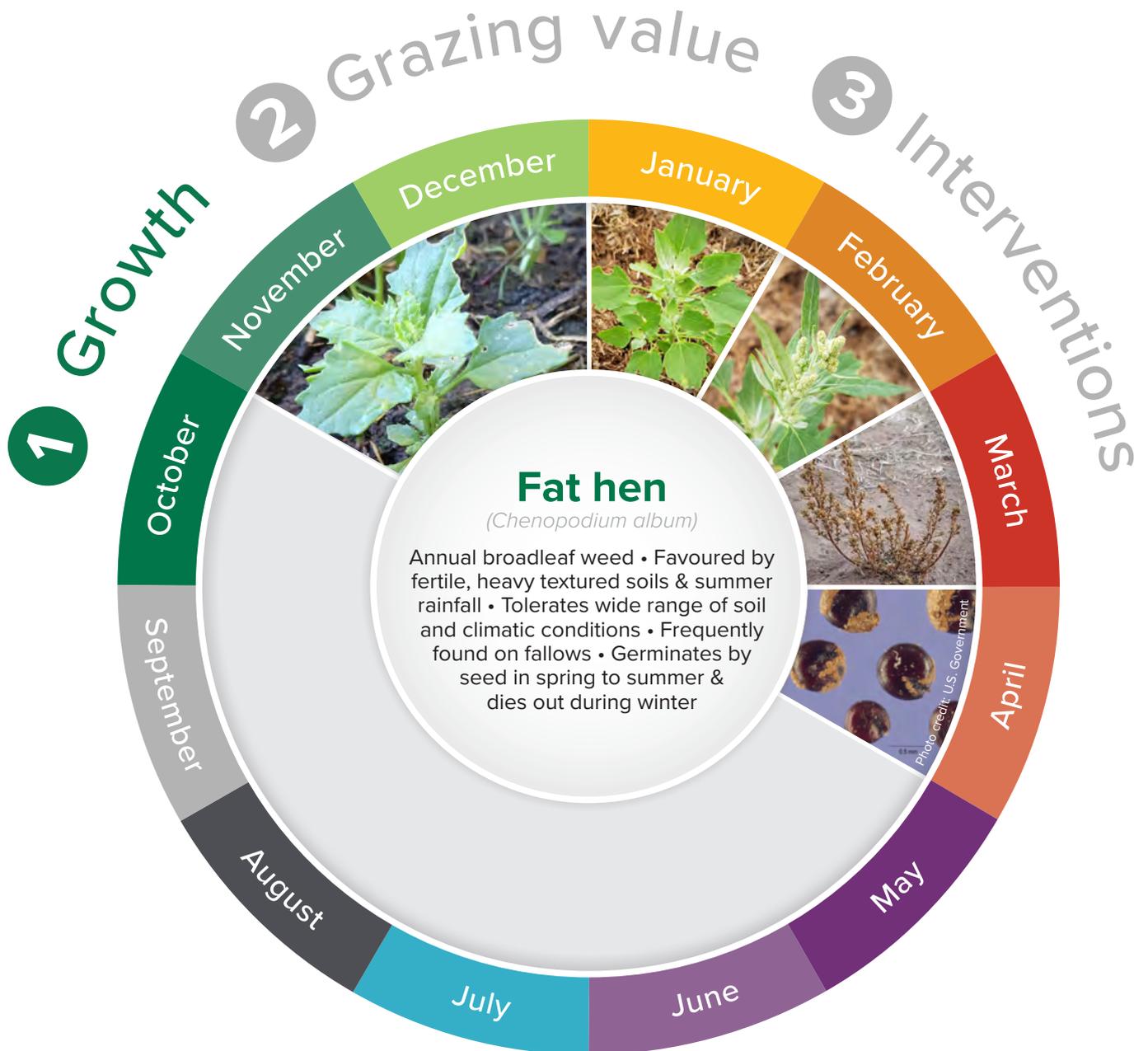
Fat hen

Chenopodium album

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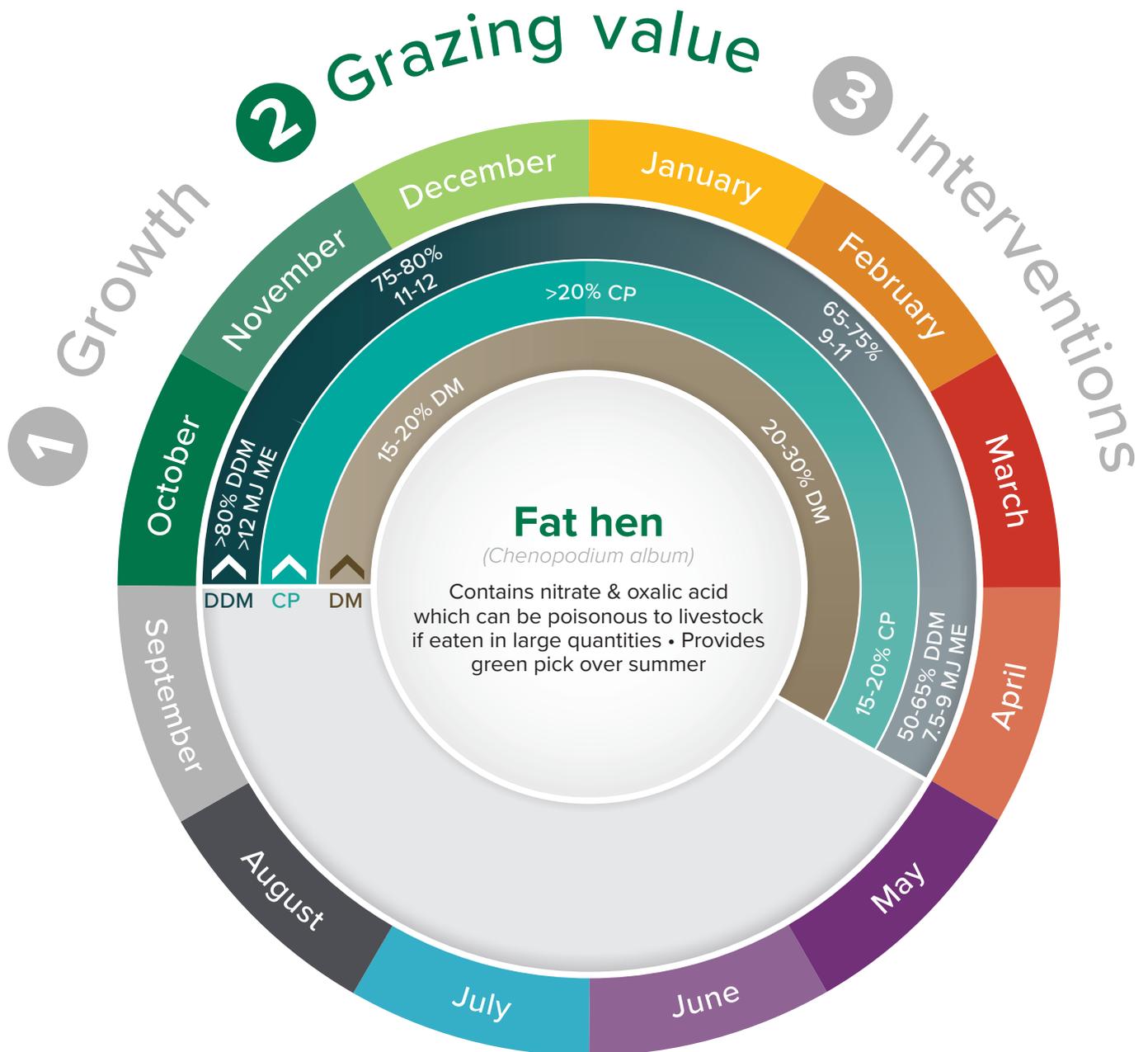
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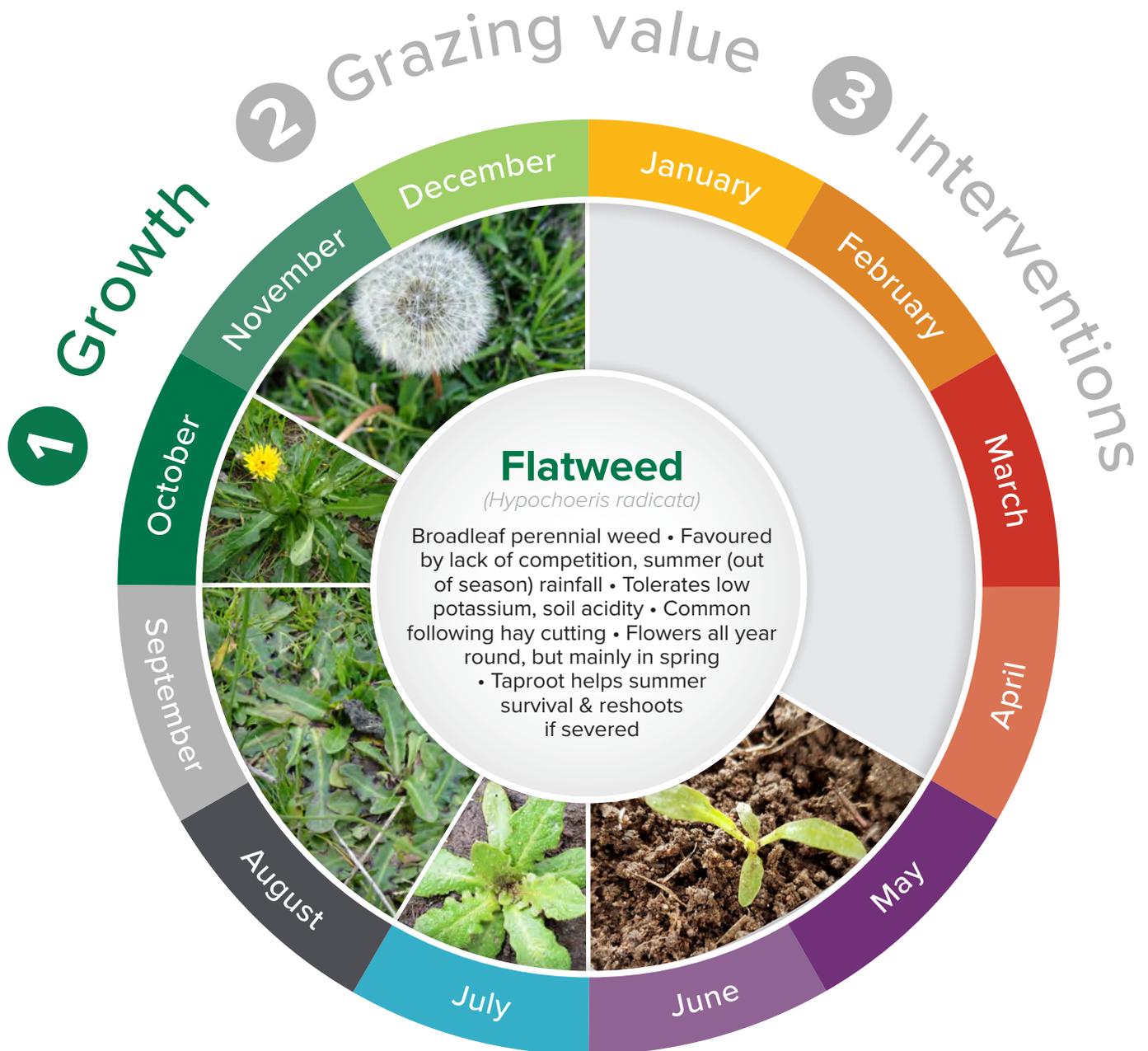
Flatweed

Hypochoeris radicata

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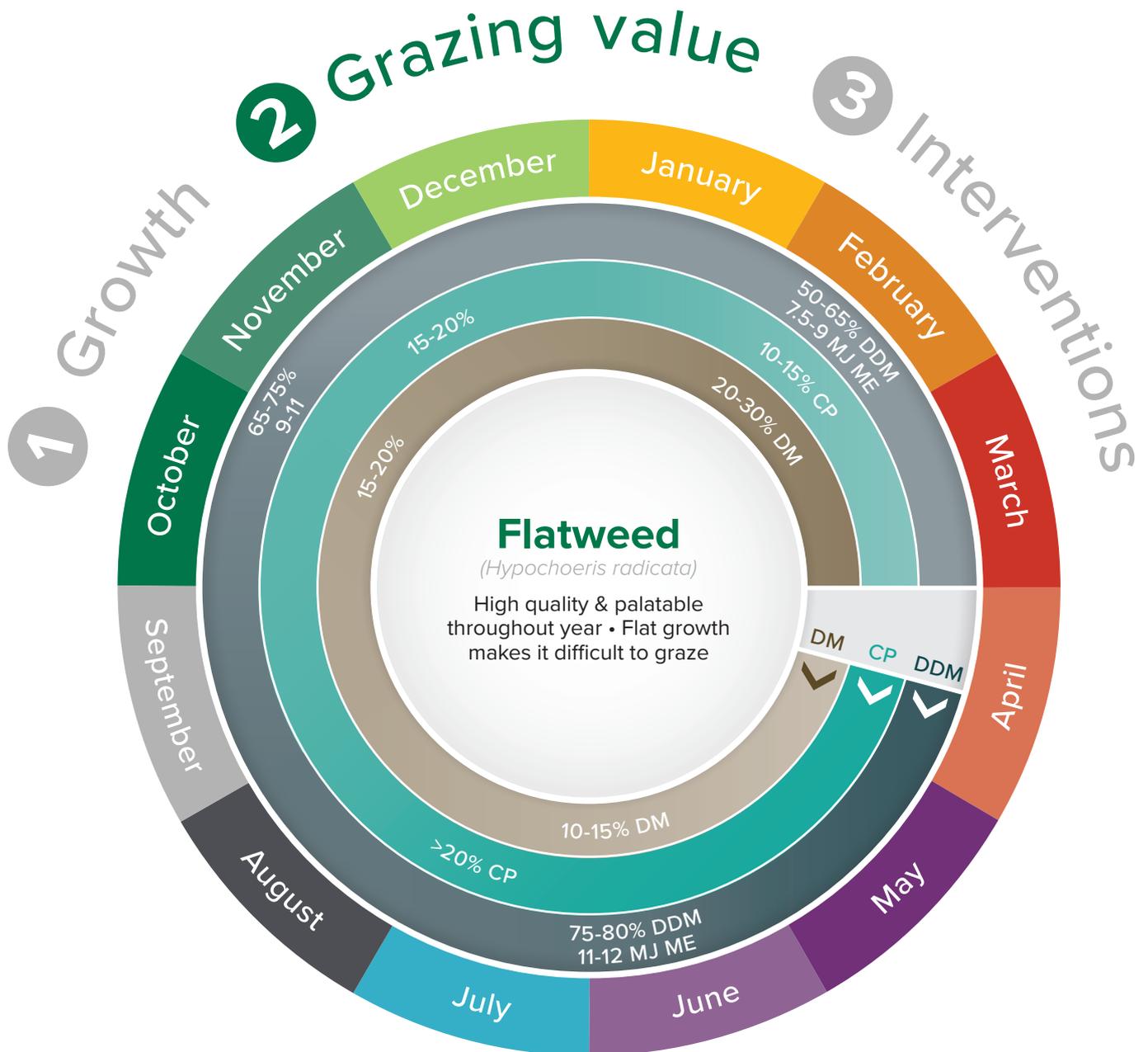
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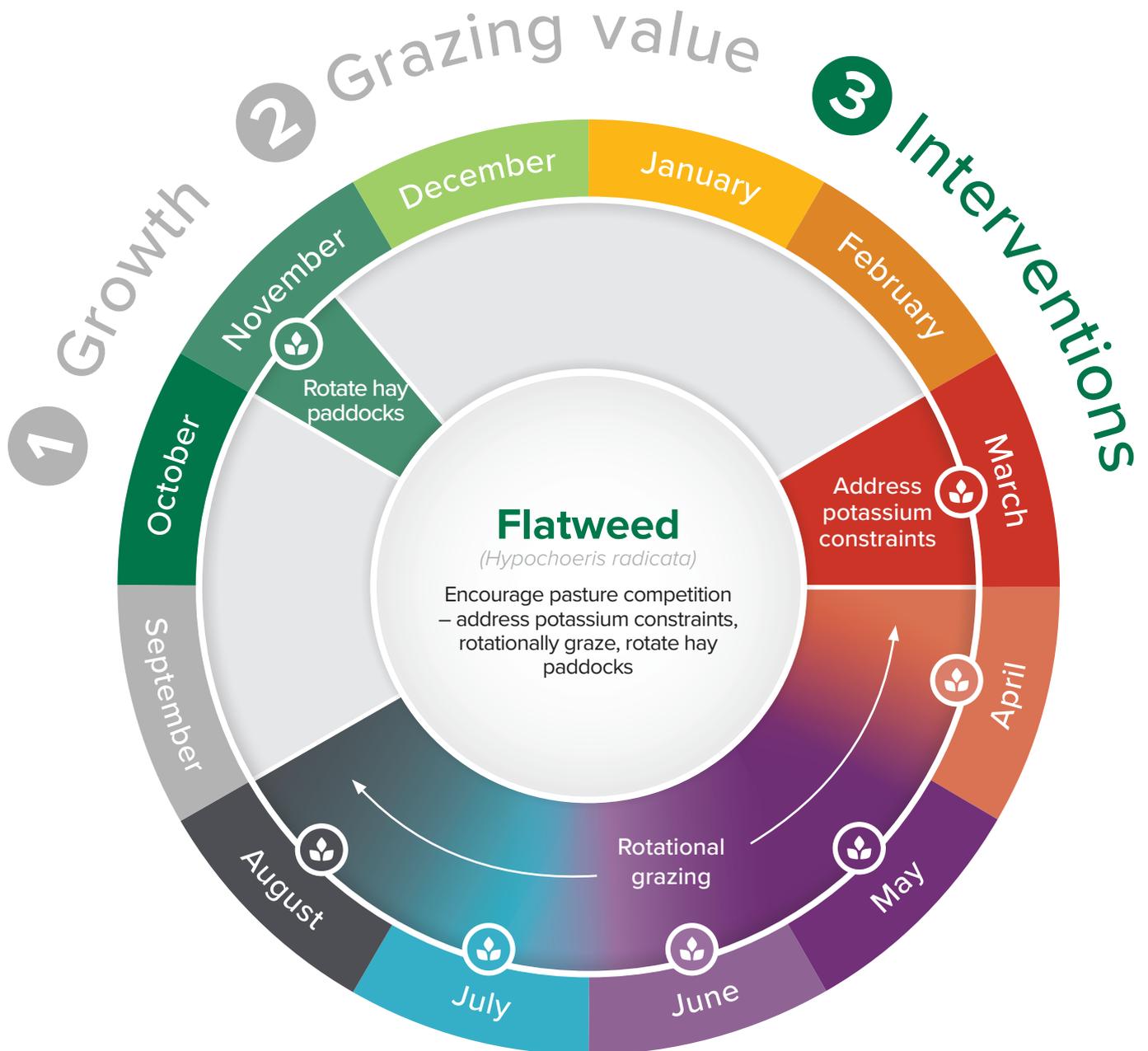
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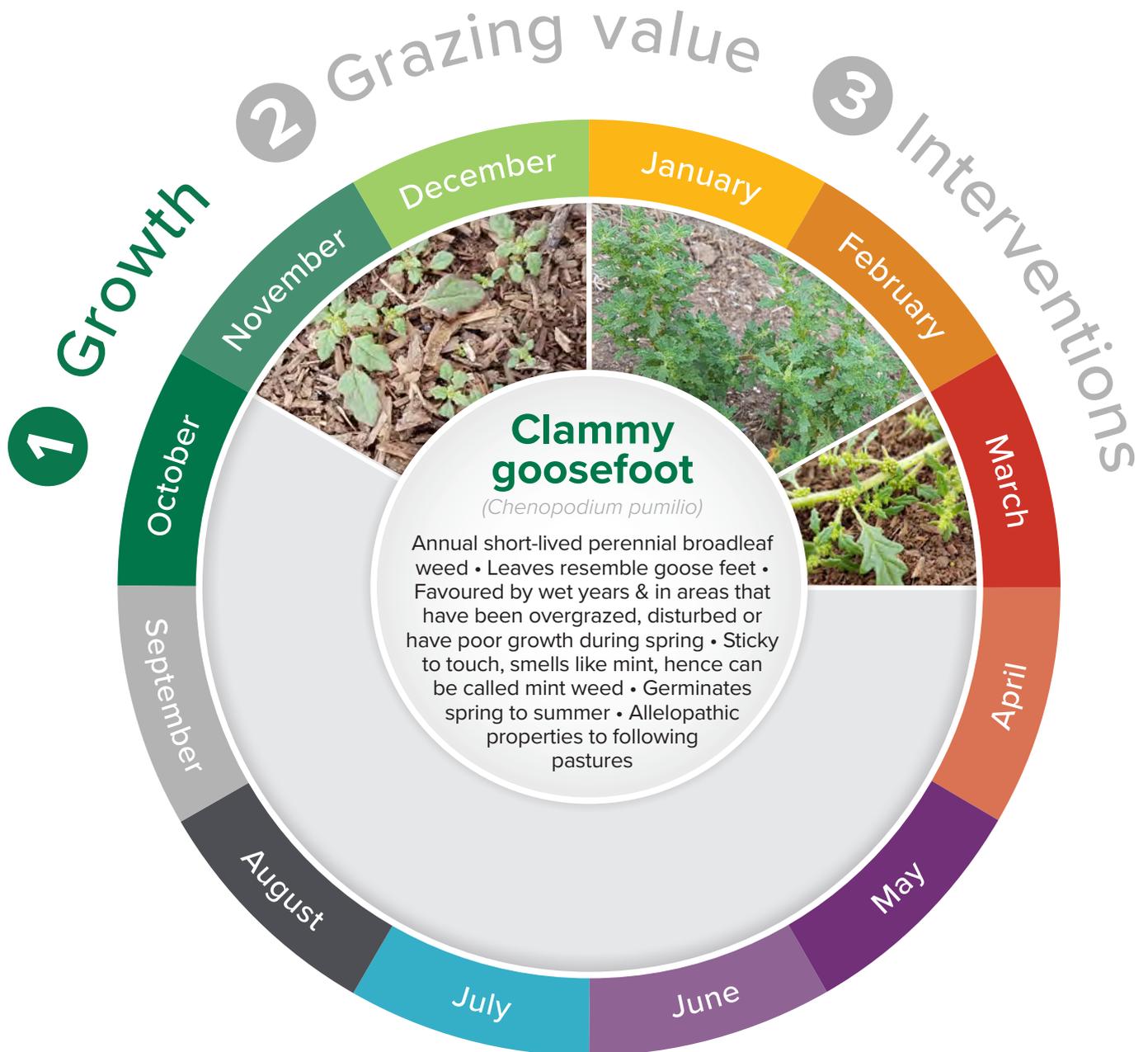
Clammy goosefoot

Chenopodium pumilio

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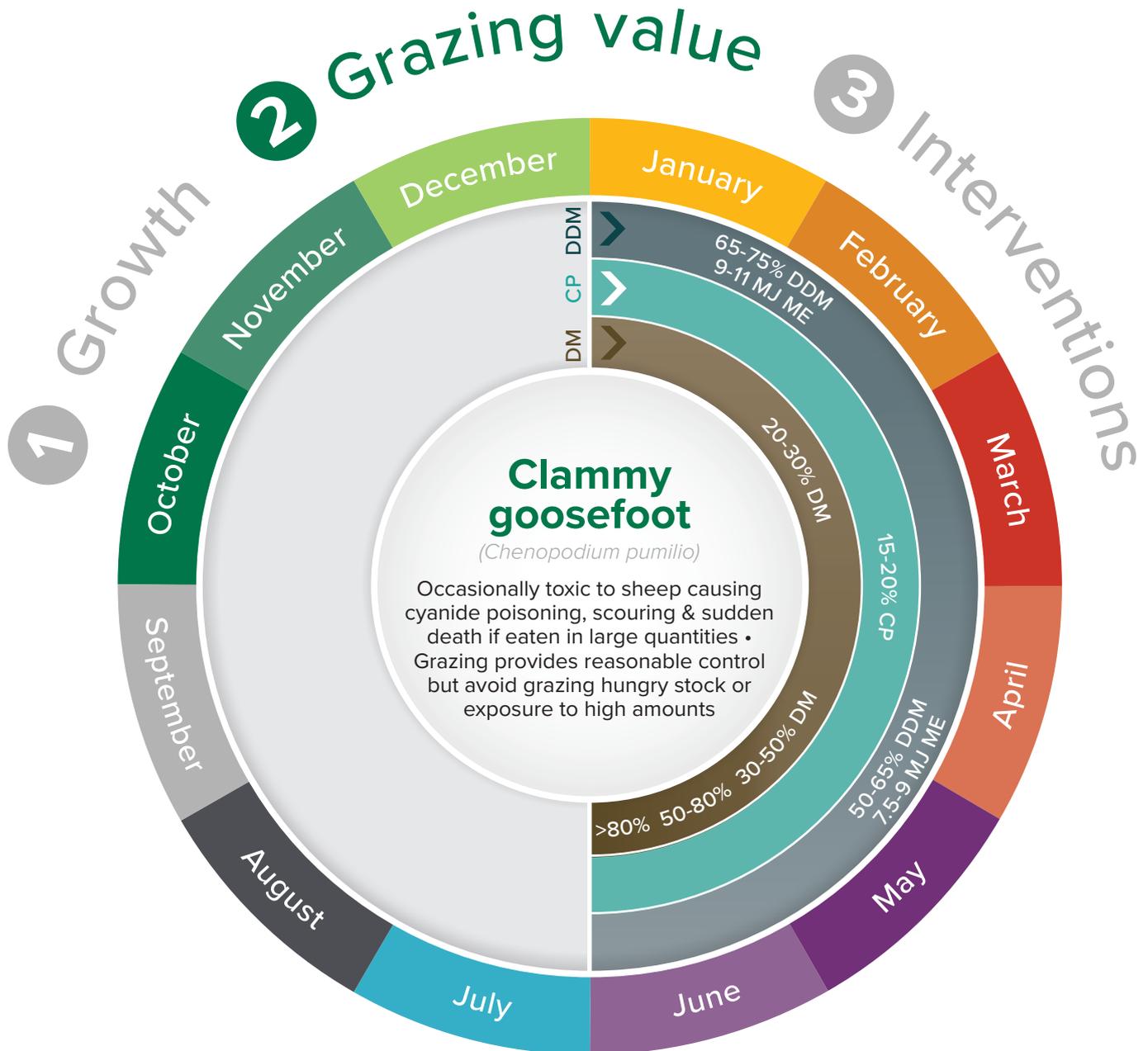
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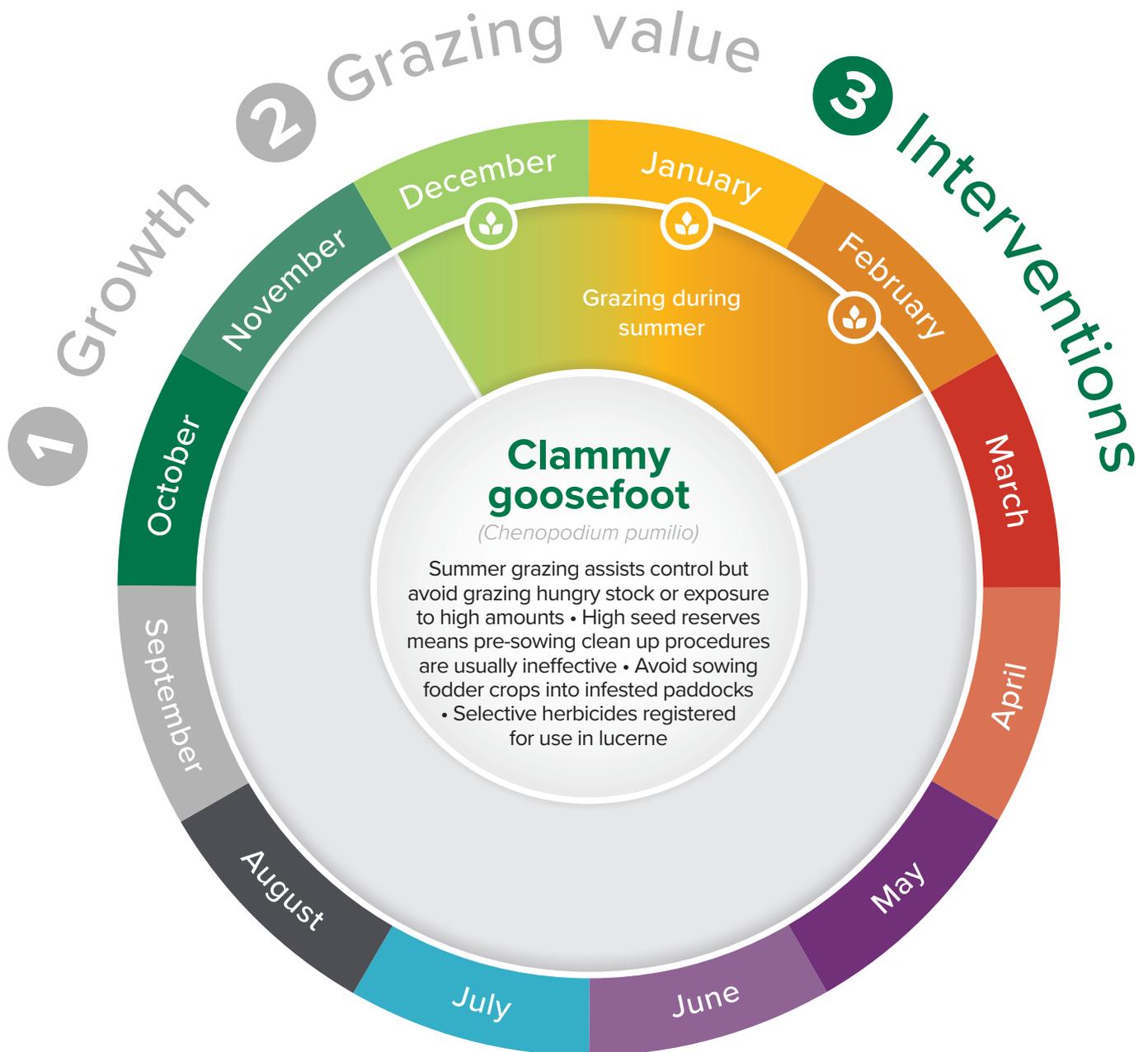
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Onion grass

Romulea rosea

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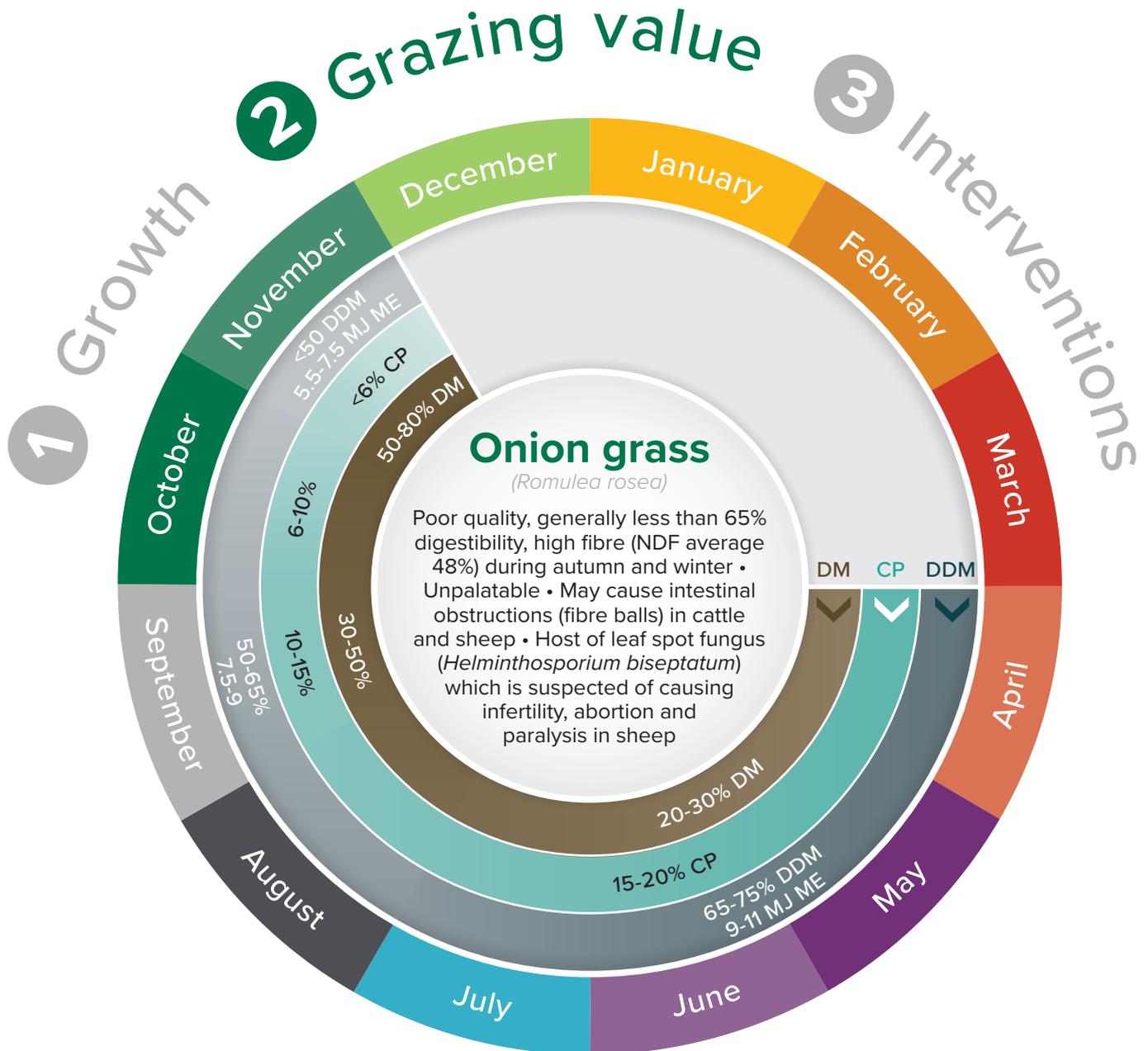
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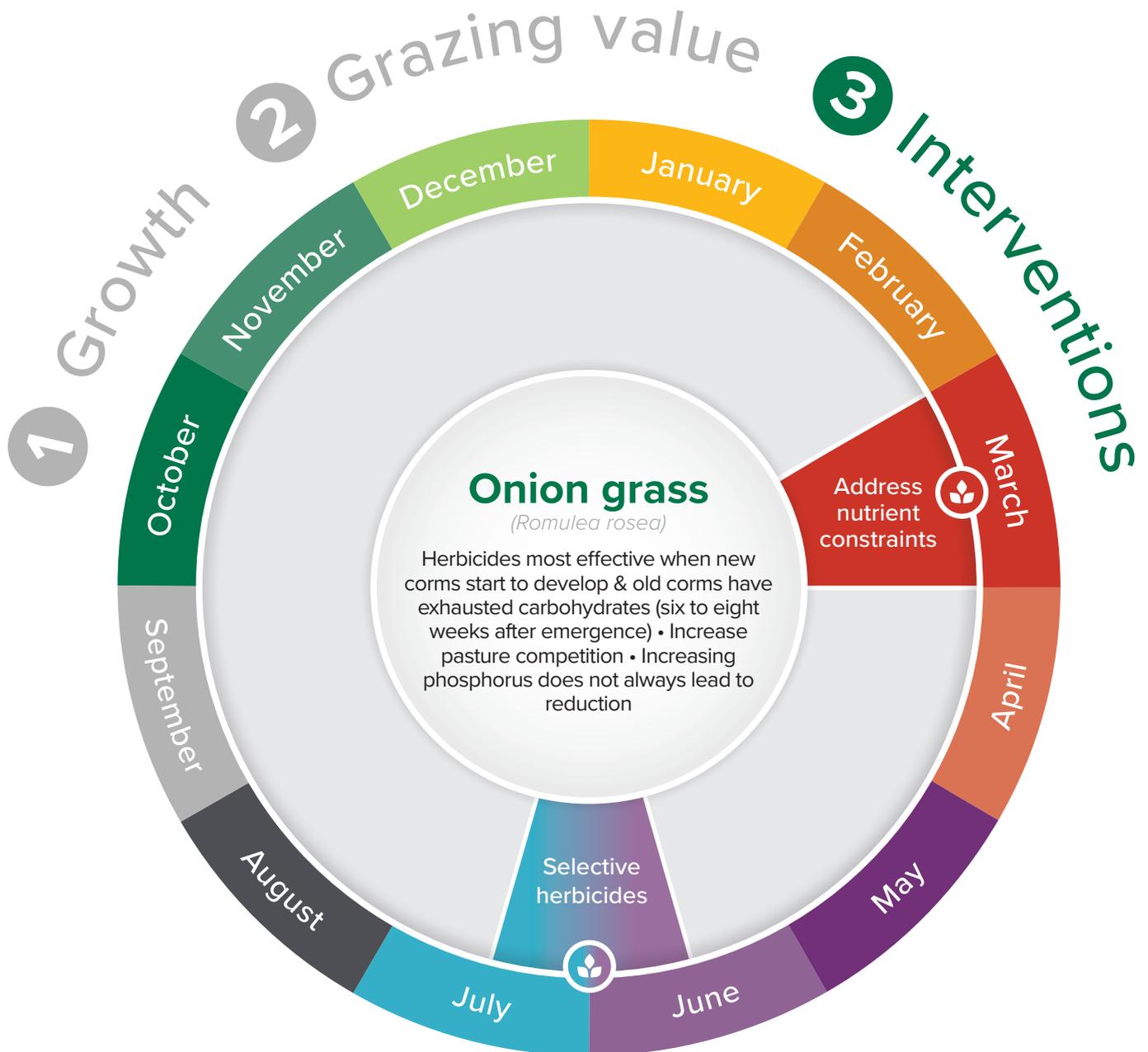
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Sow thistle

Sonchus spp.

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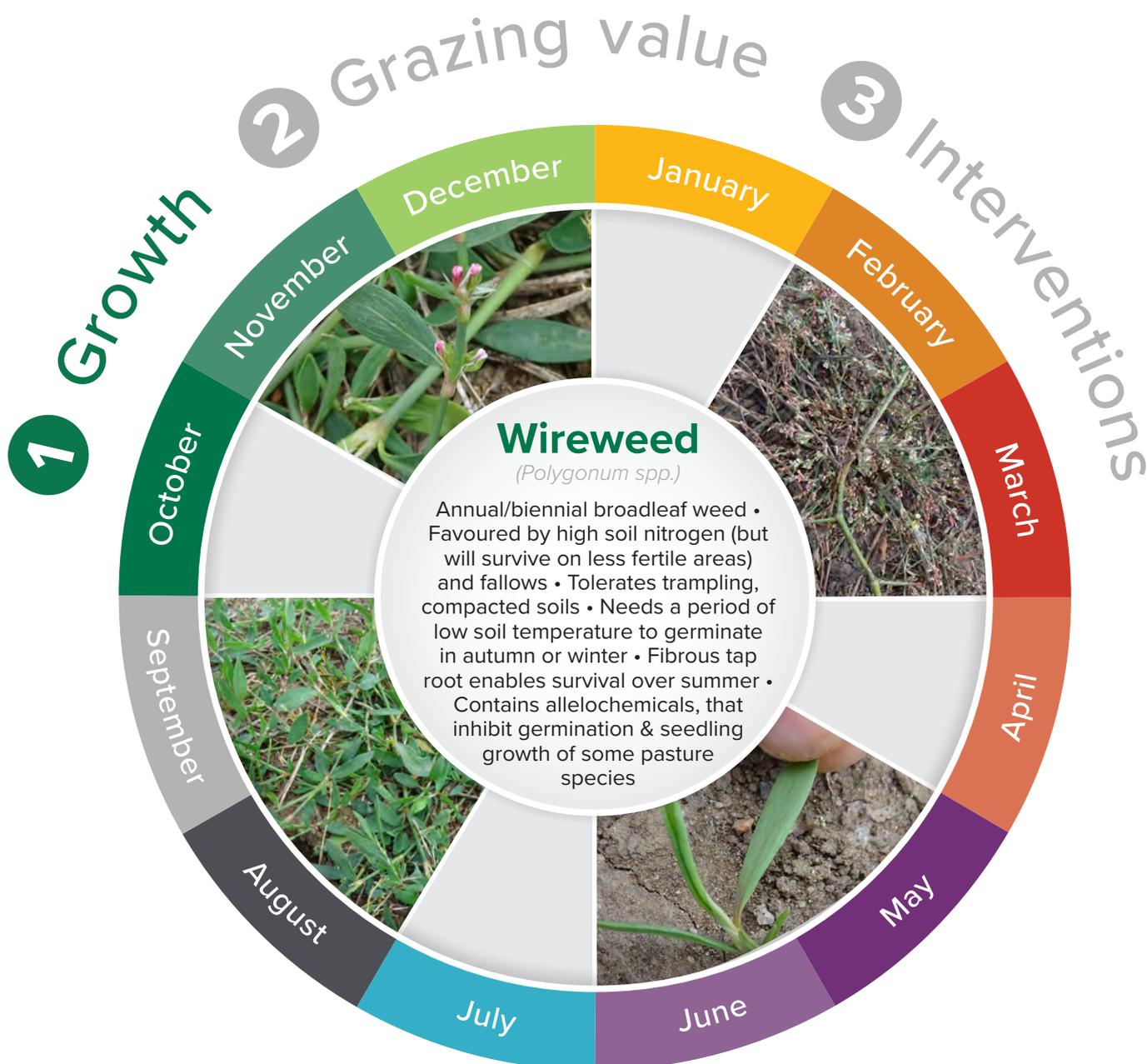
Wireweed / hogweed

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Main menu

Each wheel contains three layers: 1. Growth 2. Grazing value and 3. Interventions

To access the information on each layer, simply click on the relevant layer's number below.



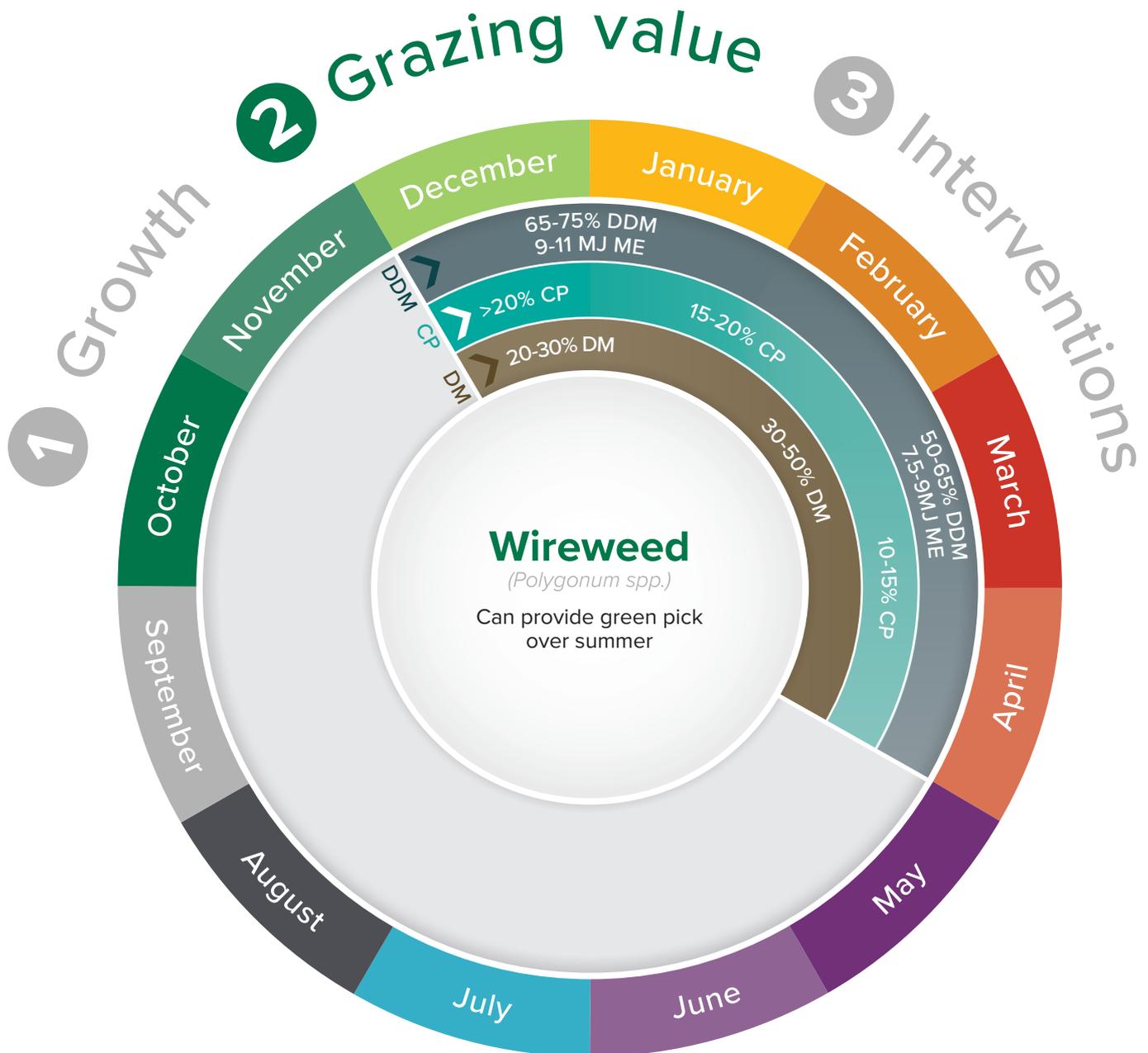
Wireweed / hogweed

Polygonum spp.

[Main menu](#)

Each wheel contains three layers: 1. Growth 2. Grazing value and 3. Interventions

To access the information on each layer, simply click on the relevant layer's number below.



DM • Dry matter

CP • Crude protein

DDM & ME • Digestibility and metabolisable energy

[About feed quality information](#)

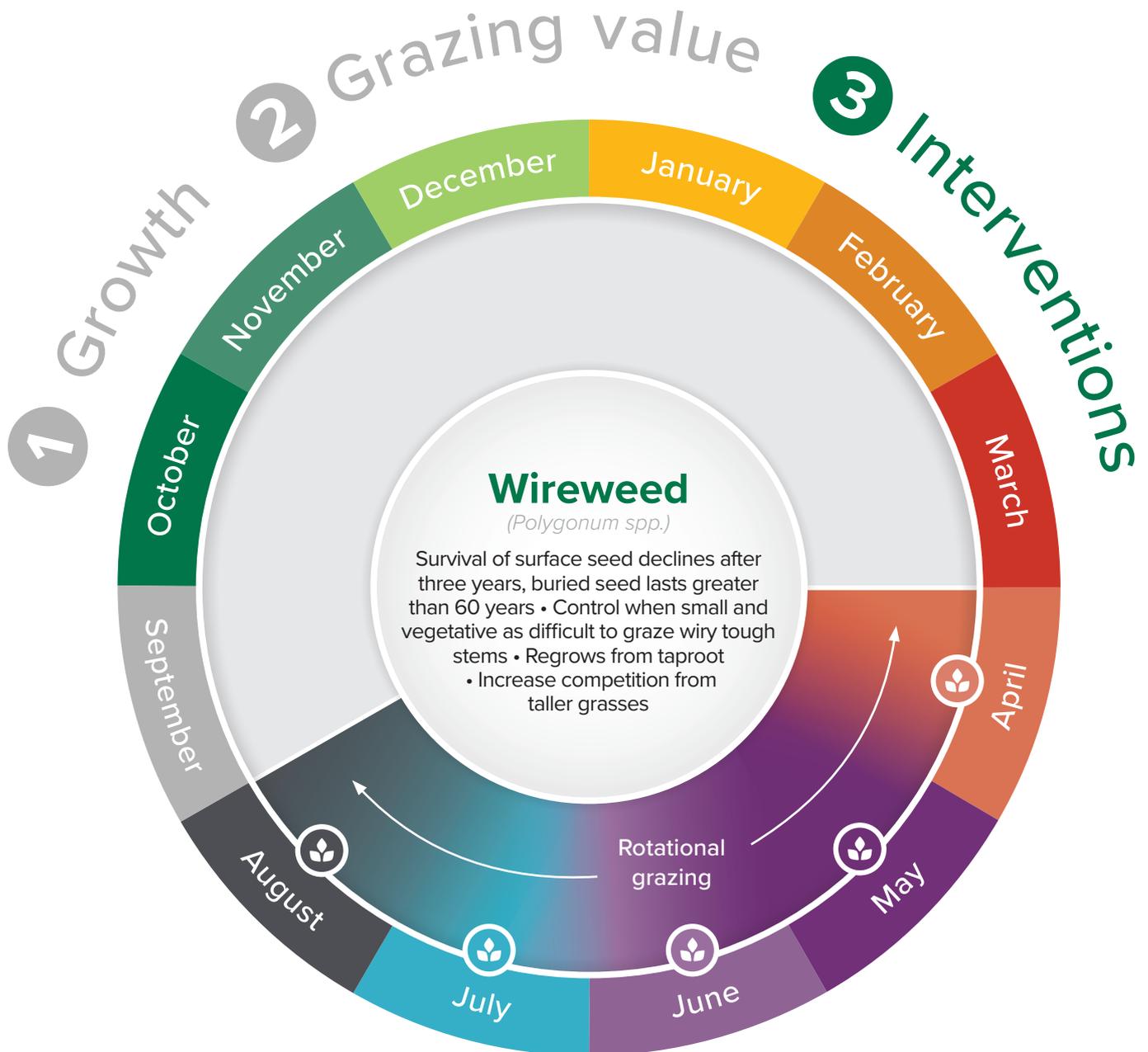
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Main menu

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Information used in *Weed fast facts* is derived from feed analysis and reference to the following resources:

- Buckley D, (2000) Yorkshire fog grass provides hardy alternative. Farming ahead No. 105. Kondinin Group.
- CABI (2020) *Poa annua* (annual meadowgrass) Invasive Species Compendium. Available at <https://www.cabi.org/isc/datasheet/42485> [Verified Aug 22, 2020]
- CABI (2020) *Chenopodium album* (fat hen) Invasive Species Compendium. Available at <https://www.cabi.org/isc/datasheet/12648> [Verified Aug 22, 2020]
- CABI (2020) *Polygonum aviculare* (prostrate knotweed) Invasive Species Compendium. Available at <https://www.cabi.org/isc/datasheet/42685> [Verified Aug 22, 2020]
- CABI (2020) *Sonchus asper* (spiny sow thistle). Available at <https://www.cabi.org/isc/datasheet/110319> [Verified Aug 22, 2020]
- CABI (2020) *Erodium cicutarium* (common storksbill) Available at <https://www.cabi.org/isc/datasheet/21843> [Verified Aug 22, 2020]
- Gardiner MR (1963). Oxalate poisoning.1. The effect of oxalate –containing plants on ruminants. Journal of the Department of Agriculture. Western Australia. Available at: https://researchlibrary.agric.wa.gov.au/cgi/viewcontent.cgi?article=3478&context=journal_agriculture4 [Verified Aug 22, 2020]
- GRDC (2019) In: Section 2: Profiles of common cropping weeds, Integrated weed management in Australian cropping systems manual. (Ed A Preston) (Grains Research and Development Corporation)
- GRDC (2019) In: Section 2: Herbicide resistance, Integrated weed management in Australian cropping systems manual. (Ed A Preston) (Grains Research and Development Corporation)
- Hamilton L, (1999) Silver grass- Useful winter feed. In: 40th Annual conference proceedings. Research in Progress. Grassland Society of Victoria.
- HerbiGuide (2014) Annual ryegrass. (HerbiGuide Pty Ltd, Albany, WA) Available at http://www.herbiguide.com.au/Descriptions/hg_Annual_Ryegrass.htm [Verified Aug 22, 2020]
- HerbiGuide (2014) Soft Brome. (HerbiGuide Pty Ltd, Albany, WA) Available at http://www.herbiguide.com.au/Descriptions/hg_Soft_Brome.htm [Verified Aug 22, 2020]
- HerbiGuide (2014) Capeweed. (HerbiGuide Pty Ltd, Albany, WA) Available at http://www.herbiguide.com.au/Descriptions/hg_Capeweed.htm [Verified Aug 22, 2020]
- Hill JO, Simpson RJ, Wood JT, Moore AD and Chapman DF (2005) The phosphorus and nitrogen requirements of temperate pasture species and their influence on grassland botanical composition. *Australian Journal of Agricultural Research* **56**, 1027-1039.
- Hill R 1998 What is the ideal environment for bent grass. Information notes Department of Primary Industries. Victorian government.

Massey University (2019) Annual poa. Available at <https://www.massey.ac.nz/massey/learning/colleges/college-of-sciences/clinics-and-services/weeds-database/annual-poa.cfm> [Verified Aug 22, 2020]

MLA (2013) Winning against seeds. Management tools for your sheep enterprise. Meat & Livestock Australia.

Peltzer S (2020) Silver grass. Department of Primary Industries and Regional Development. Available at <https://www.agric.wa.gov.au/grains-research-development/silver-grass> [Verified Aug 22, 2020]

Peltzer S (2020) Annual ryegrass. Department of Primary Industries and Regional Development. Available at <https://www.agric.wa.gov.au/grains-research-development/annual-ryegrass> [Verified Aug 22, 2020]

Peltzer S (2020) Barley grass. Department of Primary Industries and Regional Development. Available at <https://www.agric.wa.gov.au/grains-research-development/barley-grass> [Verified Aug 22, 2020]

Peltzer S, Borget C and Hashem A (2018) Brome grass. Department of Primary Industries and Regional Development. Available at <https://www.agric.wa.gov.au/grains-research-development/brome-grass> [Verified Aug 22, 2020]

Preston C (2018) Managing problem annuals in productive systems. In: 9th Annual conference proceedings. The tactics for fantastic. Perennial Pasture Systems. Ararat.

Schroder P (1998) Capeweed and erodium in pastures. Agnote. Department of Primary Industries, Victorian government.

Severi J and McDonald G (2019) Redlegged earth mite. Pest notes southern. Available at

<http://cesaraustralia.com/sustainable-agriculture/pestnotes/insect/Redlegged-earth-mite> [Verified Aug 22, 2020]

Tozer KN, Chapman DF, Quigley PE, Dowling PM, Cousens RD and Kearney GA (2009) Integrated management of *Vulpia* in dryland perennial pastures of southern Australia. *Crop and Pasture Science* **60**, 32-42.

University of Tasmania, (2019) Key to Tasmanian vascular plants. Available at https://www.utas.edu.au/dicotkey/dicotkey/CARYOPH/sChenopodium_pumilio.htm [Verified Aug 22, 2020]

Victorian Department of Primary Industries (2006) In: Keeping weeds under control. In: Greener pastures for south west Victoria. (Eds Z Nie and G Saul) (Victorian Department of Primary Industries, Hamilton)

Watt, T (1978) The biology of *Holcus lanatus* L. (Yorkshire fog) and its significance in grassland. Herbage abstracts 48. Commonwealth Agricultural Bureau, UK.

Zhongnan N, Zollinger R, Stevenson A and Knee B (2012) Chemical control of onion grass (*Romulea rosea*) in native pastures. In *Proceedings of 16th Australian Agronomy Conference*. (Ed I. Yunusa) (Armidale, NSW)