

Mid-north coast NSW Forage Value Index

Italian ryegrass

2024 Update

The Forage Value Index (FVI) is a tool that helps Australian dairy farmers and their advisors to make more informed decisions when selecting ryegrass cultivars.

It provides an accurate, reliable and independent assessment of the potential economic value of ryegrass cultivars across three different species (Perennial, Annual and Italian ryegrass) in a number of dairy-producing regions across Australia. The FVI is calculated by multiplying the Performance Value of each cultivar (i.e. total kilograms dry matter produced per hectare per season) by its Economic Value (i.e. the estimated value of this extra production per season). Performance Values for each variety are determined by industry assessed trial data. To be included in the FVI database, each cultivar must have data from at least three trials that have been conducted using strict industry approved protocols. For Perennial ryegrass, trials must be three years in length, while Annual and Italian ryegrass trials must be a minimum of one full growing season.

Reference varieties

Across the three different species of ryegrass, the Performance Value is expressed as the percentage change in yield relative to a selected reference cultivar that effectively acts as the genetic base for that species in the FVI.

Figure 1 Map of trial locations across South-eastern Australia that contributed to the FVI.



The reference cultivar is a well-known variety for each ryegrass species, where farmers and advisors are more likely to have a good understanding and knowledge of its performance over many years across various environments. The reference cultivars for each species are as follows:

- Perennial ryegrass: **Victorian Ryegrass (Vic Rye)**
- Annual ryegrass: **Tetila (from a certified source to ensure consistency across trials)**
- Italian ryegrass: **Crusader.**

Coloured bars

The FVI for each cultivar is expressed as a numerical value and is also assigned within a coloured bar. The FVI value is a prediction of extra operating profit per hectare over and above the reference cultivar in each species, which always has an FVI value of 0. Cultivars within the same-coloured bar are not significantly different to each other at the 95 per cent confidence interval.

The FVI information allows users to rank cultivars according to their region and user nominated attributes (e.g. seasonal yields, ploidy, heading date, endophyte). The number of trials in which the cultivar has been tested is also included in the table.

Seasonal yield tables

The accompanying tables of cultivar performance during the various FVI seasons are of particular importance to dairy farmers, depending upon their farming system and calving pattern. For example, dairy farmers that calve in the autumn might favour those cultivars that have a higher performance value for autumn and winter as they would likely value greater winter growth in their pastures. The vast majority of trial data comes from the Pasture Trial Network (PTN), and users can now check out the details of individual trials on the PTN in addition to the FVI rankings. They can be accessed at etools.mla.com.au/ptn or by scanning the QR code.



Autumn seasonal values for Annual and Italian ryegrass FVIs

In 2023, performance values for autumn in the Annual and Italian ryegrass FVIs were removed from the index. The first harvest was not taken from the majority of these trials until after 31 May and this meant that data for autumn (March-May), which reflects very early establishment in these varieties was too limited for us to fully be confident it accurately reflected differences in the varieties at this time of the year. The solution is to generate more yield data before 31 May by sowing these trials earlier in the growing season. However, most trials are dryland and therefore the timing of the autumn break is a big factor in establishing trials successfully.

Recent autumn breaks in many regions particularly in Victoria have been very variable. This change only applies to Annual and Italian ryegrass FVIs. Perennial trials run for three years and so sufficient data is collected in autumn in these trials.

In 2023, three new Italian ryegrass trials were sown early enough to generate yield data before 31 May, so next years FVI (2025) will have autumn performance values once again, when these trials are added to the FVI.



Mid-north coast NSW: Forage Value Index 2024 – ITALIAN RYEGRASS

Cultivar	FVI Mid-nth coast NSW	Total trials	Winter	Early spring	Late spring	Summer	Endophyte	Ploidy	Heading date	Marketer	Mid-nth coast NSW trials
Tempo	122	18	106	104	106	104	Nil	Diploid	Late	Barenbrug Australia	3
Arise	98	16	104	102	103	107	Nil	Tetraploid	Late	Barenbrug Australia	3
Amass	83	8	97	101	107	107	Nil	Tetraploid	Mid	Valley Seeds	2
Accelerate 2	61	9	95	100	103	111	Nil	Diploid	Late	RAGT	2
Manta	59	7	97	98	104	109	Nil	Diploid	Late	DLF Seeds	1
Aston	43	8	107	101	103	96	Nil	Tetraploid	Late	Barenbrug Australia	2
Feast II	38	20	97	98	104	106	Nil	Tetraploid	Late	DLF Seeds	4
Lush AR37	18	11	100	97	101	105	AR37	Tetraploid	Late	DLF Seeds	1
Mona	9	14	97	98	105	100	Nil	Tetraploid	Late	DLF Seeds	4
Concord II	6	18	100	99	100	103	Nil	Diploid	Late	DLF Seeds	4
Crusader	0	10	100	100	100	100	Nil	Diploid	Late	DLF Seeds	1
Indulgence	0	6	88	103	103	103	Nil	Diploid	Late	RAGT	1
Emmerson	-8	5	76	95	111	110	Nil	Tetraploid	Late	RAGT	1
Jackpot	-11	14	99	99	101	98	Nil	Diploid	Late	DLF Seeds	4
Awesome	-13	6	99	105	100	93	Nil	Diploid	Late	Upper Murray Seeds	1
Echo	-15	5	90	98	104	102	Nil	Tetraploid	Mid	Tas Global Seeds	0
Nourish	-20	8	98	96	100	103	Nil	Tetraploid	Late	DLF Seeds	3
Combat	-30	4	105	105	97	89	Nil	Diploid	Mid	Upper Murray Seeds	1
Gusto	-38	4	87	101	102	101	Nil	Diploid	Mid/Late	AGF Seeds	1
Knight	-69	18	102	97	97	93	Nil	Diploid	Late	DLF Seeds	4
Thumpa	-69	18	98	97	99	94	Nil	Tetraploid	Late	DLF Seeds	4
Xtend	-90	11	84	94	103	100	Nil	Diploid	Mid	AGF Seeds	2
Blade	-250	4	79	91	101	82	Nil	Diploid	Late	Cropmark Seeds	0
Sonik	-272	4	84	91	89	89	Nil	Diploid	Late	Cropmark Seeds	0

Notes

- 1 Crusader was chosen as the reference cultivar for the Italian ryegrass FVI, due to its relative performance being more widely known by the dairy industry compared to the other options. Unlike the Perennial and Annual FVIs where the reference cultivars used were towards the bottom of the FVI tables, Crusader is still a mid-ranking cultivar in the Italian ryegrass FVI despite being commercially available for many years. Therefore several cultivars in the Italian FVI have a negative FVI relative to Crusader. The reference cultivar in the FVI is always zero, and the FVI for all other cultivars in the list are measured against this line.
- 2 Data to create the performance values for each cultivar were taken from 20 Italian ryegrass trials. The trials were located in the following regions and were measured at various stages between 2015 and 2022 – Leongatha, Terang, Howlong (x4), Kiewa Valley, Shepparton, Taree, Aberdeen (x3), Meander Valley, Lardner Park, Bega, Warrnambool, Colac and Macarthur. Two new trials were added to the Italian ryegrass FVI this year from Oaks (Tasmania) and Bairnsdale (Gippsland).
- 3 In the Italian ryegrass FVI, only trial data from the first year of growth is included in the calculations. The majority of Italian ryegrass PTN trials do not persist into a second year – in future when there is sufficient data from year two of a trial for Italian cultivars it will be included in a two-year Italian ryegrass FVI.
- 4 The total number of trials can be used as an indication of the reliability of the ranking for each cultivar. Cultivars with large trial numbers are likely to be more accurate in their position in the list. The minimum number of trials is three, and most of these cultivars are newer and will have more trial data added to the FVI in the coming years to bolster their accuracy.

Legend

Heading	Description
Cultivar	A plant variety that has been produced by selective breeding. Cultivars are as listed as on the Australian Seed Federation Pasture Seed Database.
Colour bars	Cultivars with the same colour are not significantly different from each other.
FVI	The rating is based on the outcome of economic and performance values for each cultivar.
Total trials	To be included in the Italian ryegrass Forage Value Index database, each cultivar must have data from at least three, one-year trials.
Seasonal performance	A performance value is based on the difference in dry matter production between a cultivar's seasonal performance and that of Crusader Italian ryegrass. This is a percentage ranking – percent better or worse than Crusader ryegrass. <i>For example, Crusader is always 100 for each FVI season. A cultivar that is 110 means that it produced 110 per cent of the dry matter produced by Crusader in that particular FVI season. A cultivar that is 97 means it produced 97 per cent of the dry matter produced by Crusader in that particular FVI season.</i>
Autumn	March/April/May
Winter	June/July
Early spring	August/September
Late spring	October/November
Summer	December/January/February
Endophyte	A fungus which protects plants from a range of insect pests. Different types of endophytes affect persistence, dry matter production, insect pest species and nutritive value in different ways.
Ploidy	The number of chromosomes per cell in the plant. A diploid ryegrass has two, while a tetraploid has four.
Heading date	The date when 50 per cent of the plants of a variety have emerged seed heads in a typical year. Heading dates are listed on the Australian Seed Federation Pasture Seed Database.
Marketer	The company marketing the cultivar.



Economic values

The economic values are a key aspect of the overall Forage Value Index. While the performance values are the same across all regions in the FVI at present, the seasonal value of the extra pasture is different across the regions. Hence, localised regional tables are provided to more accurately reflect the marginal value of a kilogram of ryegrass in the different parts of the country. The way the economic values are calculated for the FVI changed for the 2022 release.

Original individual case study farm approach

When the FVI was first introduced, economic values were developed using a case study farm approach in each of the four regions where Perennial ryegrass is dominant (South-west Victoria, Northern Victoria, Gippsland and Tasmania). A typical dairy system based on a real farm business in each region was modelled, with the base monthly estimated metabolisable energy requirements of the herd, the feed consumed, and the pasture consumption per hectare defined. For each of the five FVI seasons, the economic value of the additional pasture to the case study farm system was estimated according to the market value of feeds that the additional pasture replaced (on an equivalent energy basis), or as the net market value of hay or silage produced if the additional pasture was surplus to the case study farm requirements. Farming systems, even within regions in Australia, are quite diverse by comparison to other pasture based dairy industries elsewhere in the world. The case study farm approach to determine economic values provided a good indication of the general value of additional pasture yield in each region, but was limited by how representative the case study farm is for each region.

New market value approach

The new approach for calculating economic values simplifies the way extra seasonal pasture production is valued. Seasons when grazed pasture is typically in deficit and in surplus are defined for each FVI region. For example, in Gippsland, pasture was assumed to be in deficit during summer, autumn and winter, and in surplus during early and late spring. Extra pasture produced in a period when it is typically in deficit is valued more than in periods when it is typically in surplus. In seasons of deficit, extra pasture is valued as its maximum replacement cost; as purchased supplementary feed, and in seasons of surplus it is valued at its minimum salvage value; as standing hay to be conserved. Market prices (2011-2018 average price) of feeds delivered to each region were used to establish these maximum and minimum economic values on an equivalent nutritive value basis.

How the new approach for calculating economic values affects the ranking of cultivars in the FVI

A previous release of the FVI was used to compare the two methods of calculating the economic values, to assess whether it made a difference to the FVI rankings. The FVI of 19 Perennial ryegrass cultivars was calculated using the economic values from the original case study farm method and the market value approach, across the three Victorian regions. The 19 cultivars were compared to a common reference cultivar (Victorian), which was assigned a value of zero. Using the economic values calculated by the original case study farm method, the 19 cultivars were calculated to be worth an extra \$0-\$180 per ha more than Victorian ryegrass, the reference cultivar. Using the economic values calculated by the market value approach, the same 19 cultivars were calculated to be worth an extra \$24-\$200/ha more than the same reference cultivar. Hence, it is clear that there is good agreement between the two methods for calculating the economic values.

Advantages of the market value approach

There are several advantages to using the market value approach. First, the economic values are applicable to all producers who buy and sell substitutes for grazed pasture, and who experience similar timings of pasture surpluses and deficits. This removes the limitations of having a single representative farm for each region. Second, the simplified approach makes it easier to communicate how the economic values have been calculated. This enables farmers to more easily consider how the FVI rankings relate to their individual circumstances. Lastly, regional differences can be accounted for in seasonality of pasture supply, and feed types and prices, and the economic values are relatively straightforward to update once established.



New economic values updated for 2022 onwards

The 2022 update of the FVI used newly updated economic values for all three ryegrass species and the same EVs are again in use for this update in 2024. In South-west Victoria, Northern Victoria, Gippsland and Tasmania, grazed pasture was assumed to be in deficit during autumn, winter and summer, and surplus during early spring and late spring. In the two new regions of South-coast NSW and North-coast NSW, grazed pasture was assumed to be in deficit during autumn and winter and surplus during early spring, late spring, and summer.

Separate economic values for dry matter yield have now been calculated for Perennial ryegrass cultivars and for Annual/Italian ryegrass cultivars for the Victorian and Tasmanian regions. This aims to better reflect differences in the seasonal nutritive value of Perennial versus Annual/Italian ryegrasses when calculating the economic values.

Perennial ryegrass economic values for the Forage Value Index (\$/kg DM)

Region	Autumn	Winter	Early spring	Late spring	Summer
South-west Victoria	0.36	0.37	0.31	0.29	0.32
Northern Victoria	0.36	0.37	0.30	0.28	0.32
Gippsland	0.41	0.42	0.35	0.33	0.37
Tasmania	0.39	0.41	0.31	0.30	0.36

Annual and Italian ryegrass economic values for the Forage Value Index (\$/kg DM)

Region	Autumn	Winter	Early spring	Late spring	Summer
South-west Victoria	0.37	0.37	0.29	0.29	0.35
Northern Victoria	0.38	0.38	0.30	0.30	0.36
Gippsland	0.42	0.42	0.35	0.35	0.40
Tasmania	0.41	0.42	0.31	0.31	0.38
South-coast NSW	0.44	0.44	0.37	0.37	0.36
Mid-north coast NSW	0.47	0.48	0.38	0.38	0.38

Mid-north coast NSW winter seasonal performance – ITALIAN RYEGRASS

Cultivar	FVI Mid-nth coast NSW	Total trials	Winter	Early spring	Late spring	Summer	Endophyte	Ploidy	Heading date	Marketer
Aston	43	8	107	101	103	96	Nil	Tetraploid	Late	Barenbrug Australia
Tempo	122	18	106	104	106	104	Nil	Diploid	Late	Barenbrug Australia
Combat	-30	4	105	105	97	89	Nil	Diploid	Mid	Upper Murray Seeds
Arise	98	16	104	102	103	107	Nil	Tetraploid	Late	Barenbrug Australia
Knight	-69	18	102	97	97	93	Nil	Diploid	Late	DLF Seeds
Concord II	6	18	100	99	100	103	Nil	Diploid	Late	DLF Seeds
Crusader	0	10	100	100	100	100	Nil	Diploid	Late	DLF Seeds
Lush AR37	18	11	100	97	101	105	AR37	Tetraploid	Late	DLF Seeds
Awesome	-13	6	99	105	100	93	Nil	Diploid	Late	Upper Murray Seeds
Jackpot	-11	14	99	99	101	98	Nil	Diploid	Late	DLF Seeds
Nourish	-20	8	98	96	100	103	Nil	Tetraploid	Late	DLF Seeds
Thumpa	-69	18	98	97	99	94	Nil	Tetraploid	Late	DLF Seeds
Manta	59	7	97	98	104	109	Nil	Diploid	Late	DLF Seeds
Amass	83	8	97	101	107	107	Nil	Tetraploid	Mid	Valley Seeds
Mona	9	14	97	98	105	100	Nil	Tetraploid	Late	DLF Seeds
Feast II	38	20	97	98	104	106	Nil	Tetraploid	Late	DLF Seeds
Accelerate 2	61	9	95	100	103	111	Nil	Diploid	Late	RAGT
Echo	-15	5	90	98	104	102	Nil	Tetraploid	Mid	Tas Global Seeds
Indulgence	0	6	88	103	103	103	Nil	Diploid	Late	RAGT
Gusto	-38	4	87	101	102	101	Nil	Diploid	Mid/Late	AGF Seeds
Xtend	-90	11	84	94	103	100	Nil	Diploid	Mid	AGF Seeds
Sonik	-272	4	84	91	89	89	Nil	Diploid	Late	Cropmark Seeds
Blade	-250	4	79	91	101	82	Nil	Diploid	Late	Cropmark Seeds
Emmerson	-8	5	76	95	111	110	Nil	Tetraploid	Late	RAGT

Mid-north coast NSW early spring seasonal performance – ITALIAN RYEGRASS

Cultivar	FVI Mid-nth coast NSW	Total trials	Early spring	Late spring	Summer	Winter	Endophyte	Ploidy	Heading date	Marketer
Combat	-30	4	105	97	89	105	Nil	Diploid	Mid	Upper Murray Seeds
Awesome	-13	6	105	100	93	99	Nil	Diploid	Late	Upper Murray Seeds
Tempo	122	18	104	106	104	106	Nil	Diploid	Late	Barenbrug Australia
Indulgence	0	6	103	103	103	88	Nil	Diploid	Late	RAGT
Arise	98	16	102	103	107	104	Nil	Tetraploid	Late	Barenbrug Australia
Aston	43	8	101	103	96	107	Nil	Tetraploid	Late	Barenbrug Australia
Gusto	-38	4	101	102	101	87	Nil	Diploid	Mid/Late	AGF Seeds
Amass	83	8	101	107	107	97	Nil	Tetraploid	Mid	Valley Seeds
Accelerate 2	61	9	100	103	111	95	Nil	Diploid	Late	RAGT
Crusader	0	10	100	100	100	100	Nil	Diploid	Late	DLF Seeds
Jackpot	-11	14	99	101	98	99	Nil	Diploid	Late	DLF Seeds
Concord II	6	18	99	100	103	100	Nil	Diploid	Late	DLF Seeds
Echo	-15	5	98	104	102	90	Nil	Tetraploid	Mid	Tas Global Seeds
Mona	9	14	98	105	100	97	Nil	Tetraploid	Late	DLF Seeds
Feast II	38	20	98	104	106	97	Nil	Tetraploid	Late	DLF Seeds
Manta	59	7	98	104	109	97	Nil	Diploid	Late	DLF Seeds
Lush AR37	18	11	97	101	105	100	AR37	Tetraploid	Late	DLF Seeds
Thumpa	-69	18	97	99	94	98	Nil	Tetraploid	Late	DLF Seeds
Knight	-69	18	97	97	93	102	Nil	Diploid	Late	DLF Seeds
Nourish	-20	8	96	100	103	98	Nil	Tetraploid	Late	DLF Seeds
Emmerson	-8	5	95	111	110	76	Nil	Tetraploid	Late	RAGT
Xtend	-90	11	94	103	100	84	Nil	Diploid	Mid	AGF Seeds
Sonik	-272	4	91	89	89	84	Nil	Diploid	Late	Cropmark Seeds
Blade	-250	4	91	101	82	79	Nil	Diploid	Late	Cropmark Seeds

Mid-north coast NSW late spring seasonal performance – ITALIAN RYEGRASS

Cultivar	FVI Mid-nth coast NSW	Total trials	Late spring	Summer	Winter	Early spring	Endophyte	Ploidy	Heading date	Marketer
Emmerson	-8	5	111	110	76	95	Nil	Tetraploid	Late	RAGT
Amass	83	8	107	107	97	101	Nil	Tetraploid	Mid	Valley Seeds
Tempo	122	18	106	104	106	104	Nil	Diploid	Late	Barenbrug Australia
Mona	9	14	105	100	97	98	Nil	Tetraploid	Late	DLF Seeds
Manta	59	7	104	109	97	98	Nil	Diploid	Late	DLF Seeds
Feast II	38	20	104	106	97	98	Nil	Tetraploid	Late	DLF Seeds
Echo	-15	5	104	102	90	98	Nil	Tetraploid	Mid	Tas Global Seeds
Arise	98	16	103	107	104	102	Nil	Tetraploid	Late	Barenbrug Australia
Accelerate 2	61	9	103	111	95	100	Nil	Diploid	Late	RAGT
Aston	43	8	103	96	107	101	Nil	Tetraploid	Late	Barenbrug Australia
Xtend	-90	11	103	100	84	94	Nil	Diploid	Mid	AGF Seeds
Indulgence	0	6	103	103	88	103	Nil	Diploid	Late	RAGT
Gusto	-38	4	102	101	87	101	Nil	Diploid	Mid/Late	AGF Seeds
Jackpot	-11	14	101	98	99	99	Nil	Diploid	Late	DLF Seeds
Lush AR37	18	11	101	105	100	97	AR37	Tetraploid	Late	DLF Seeds
Blade	-250	4	101	82	79	91	Nil	Diploid	Late	Cropmark Seeds
Awesome	-13	6	100	93	99	105	Nil	Diploid	Late	Upper Murray Seeds
Crusader	0	10	100	100	100	100	Nil	Diploid	Late	DLF Seeds
Concord II	6	18	100	103	100	99	Nil	Diploid	Late	DLF Seeds
Nourish	-20	8	100	103	98	96	Nil	Tetraploid	Late	DLF Seeds
Thumpa	-69	18	99	94	98	97	Nil	Tetraploid	Late	DLF Seeds
Knight	-69	18	97	93	102	97	Nil	Diploid	Late	DLF Seeds
Combat	-30	4	97	89	105	105	Nil	Diploid	Mid	Upper Murray Seeds
Sonik	-272	4	89	89	84	91	Nil	Diploid	Late	Cropmark Seeds

Mid-north coast NSW summer seasonal performance – ITALIAN RYEGRASS

Cultivar	FVI Mid-nth coast NSW	Total trials	Summer	Winter	Early spring	Late spring	Endophyte	Ploidy	Heading date	Marketer
Accelerate 2	61	9	111	95	100	103	Nil	Diploid	Late	RAGT
Emmerson	-8	5	110	76	95	111	Nil	Tetraploid	Late	RAGT
Manta	59	7	109	97	98	104	Nil	Diploid	Late	DLF Seeds
Arise	98	16	107	104	102	103	Nil	Tetraploid	Late	Barenbrug Australia
Amass	83	8	107	97	101	107	Nil	Tetraploid	Mid	Valley Seeds
Feast II	38	20	106	97	98	104	Nil	Tetraploid	Late	DLF Seeds
Lush AR37	18	11	105	100	97	101	AR37	Tetraploid	Late	DLF Seeds
Tempo	122	18	104	106	104	106	Nil	Diploid	Late	Barenbrug Australia
Indulgence	0	6	103	88	103	103	Nil	Diploid	Late	RAGT
Nourish	-20	8	103	98	96	100	Nil	Tetraploid	Late	DLF Seeds
Concord II	6	18	103	100	99	100	Nil	Diploid	Late	DLF Seeds
Echo	-15	5	102	90	98	104	Nil	Tetraploid	Mid	Tas Global Seeds
Gusto	-38	4	101	87	101	102	Nil	Diploid	Mid/Late	AGF Seeds
Xtend	-90	11	100	84	94	103	Nil	Diploid	Mid	AGF Seeds
Crusader	0	10	100	100	100	100	Nil	Diploid	Late	DLF Seeds
Mona	9	14	100	97	98	105	Nil	Tetraploid	Late	DLF Seeds
Jackpot	-11	14	98	99	99	101	Nil	Diploid	Late	DLF Seeds
Aston	43	8	96	107	101	103	Nil	Tetraploid	Late	Barenbrug Australia
Thumpa	-69	18	94	98	97	99	Nil	Tetraploid	Late	DLF Seeds
Knight	-69	18	93	102	97	97	Nil	Diploid	Late	DLF Seeds
Awesome	-13	6	93	99	105	100	Nil	Diploid	Late	Upper Murray Seeds
Sonik	-272	4	89	84	91	89	Nil	Diploid	Late	Cropmark Seeds
Combat	-30	4	89	105	105	97	Nil	Diploid	Mid	Upper Murray Seeds
Blade	-250	4	82	79	91	101	Nil	Diploid	Late	Cropmark Seeds

Disclaimer

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Dairy Australia Limited ABN 60 105 227 987
 E enquiries@dairyaustralia.com.au
 T +61 3 9694 3777
 F +61 3 9694 3701
 dairyaustralia.com.au