How do I identify sub-clover cultivars?

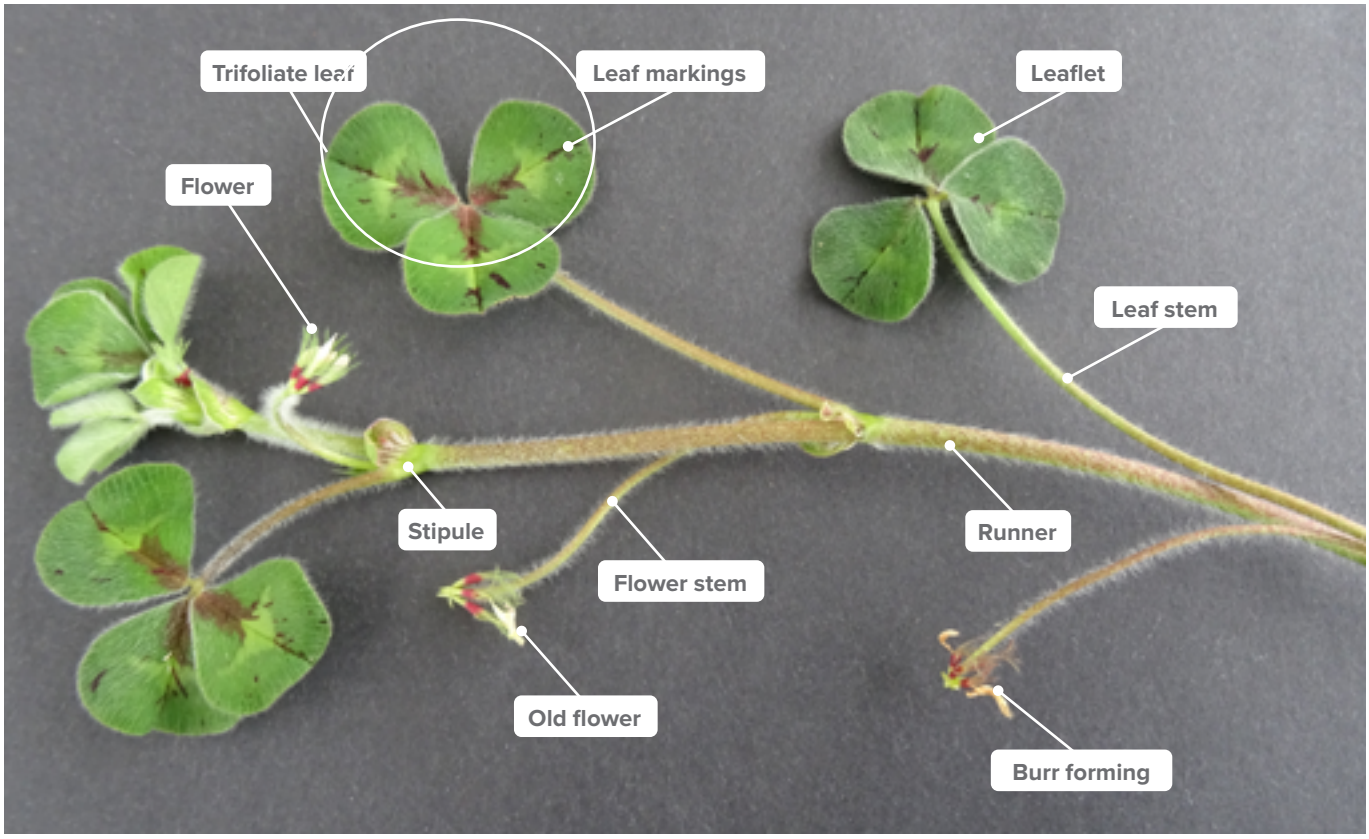
The issue:	Identification of individual sub-clover cultivars is difficult, making optimal management of sub-clover, particularly older cultivars, challenging.
The impact:	Not being able to identify problem sub-clover cultivars means up to 30% of winter production could be forfeited if growing outdated varieties. Failure to identify oestrogenic sub-clovers can impact sheep reproduction, causing health issues including permanent infertility.
The opportunity:	Developing basic skills in cultivar identification can help narrow down what sub-clover cultivars are growing in your paddocks.

Why should I get to know my sub-clover?

Identifying cultivars can be useful to determine if a pasture contains outclassed or oestrogenic (O) cultivars and to assess how well newly sown varieties are competing against residual plants.

There are at least 80 commercial varieties or cultivars of sub-clover in Australia, along with many naturalised strains and crosses. Accurate identification can be difficult and at times can only be made by experienced agronomists or researchers.

Figure 1. Features of sub-clover during spring.



Tips for identification

The first step is identifying distinguishing features on sub-clover plants. Sub-clover has hairs on the back of its rounded trifoliate leaves and small white flowers (3–5 per stalk), making it readily distinguishable from other clover species.

Tips for selecting plants for optimal identification include:

1. **Timing:** plants grow under ideal conditions in early spring. At this time, leaf markings and key distinguishing factors, such as runner hairiness and colouring of the flower tube, are apparent. Many sub-clover cultivars have leaf markings that change from winter to spring and can fade with flowering.
2. **Location:** select leaflets, stipules and flower tubes from runners exposed to sunlight, as pigmentation is reduced when shielded from light (Figure 1).
3. **Selection:** it is likely there will be different cultivars growing together. Break off a runner from one plant to examine its features. This helps avoid confusion as runners can become tangled.
4. **Look at the whole plant:** inspect several leaves or stipules on the runners of each plant. Distinguishing features may change slightly along a runner depending on maturity.

Hairs on the back of the leaf helps identify sub-clover from other commonly grown clover species, such as white or balansa clover.

Narrowing down cultivar possibilities

The following features should be examined on collected representative plants. This will narrow the sub-clover cultivar into one of six groups (see Figure 2).

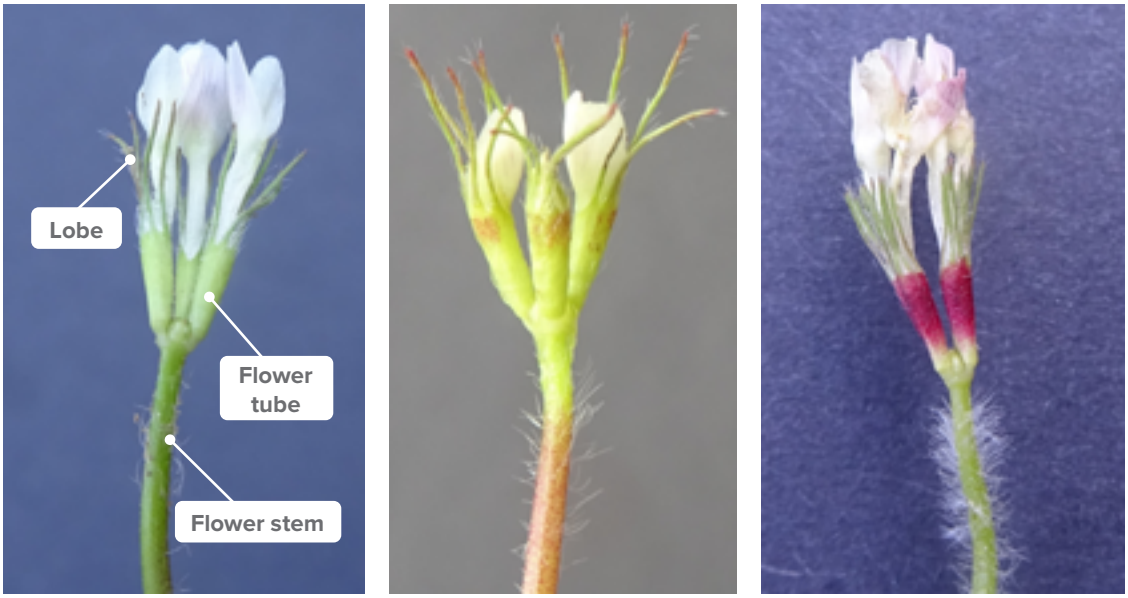
1. Hairs on the runners

Runners are either considered hairy/very hairy or have no or few hairs.

Very hairy runner (left) to minimal hairs (right).

2. Flower tube (calyx) colour

Flowers on most varieties have green flower tubes, but some have distinct or faded red bands that can cover 25–100% of the tube. Some can have lobes on the flower tube that are lightly pigmented.



The flower tube on left is green, the flower tube in the middle has light pigmentation on the top quarter and on the right, purple-red pigmentation covers three-quarters of the tube.

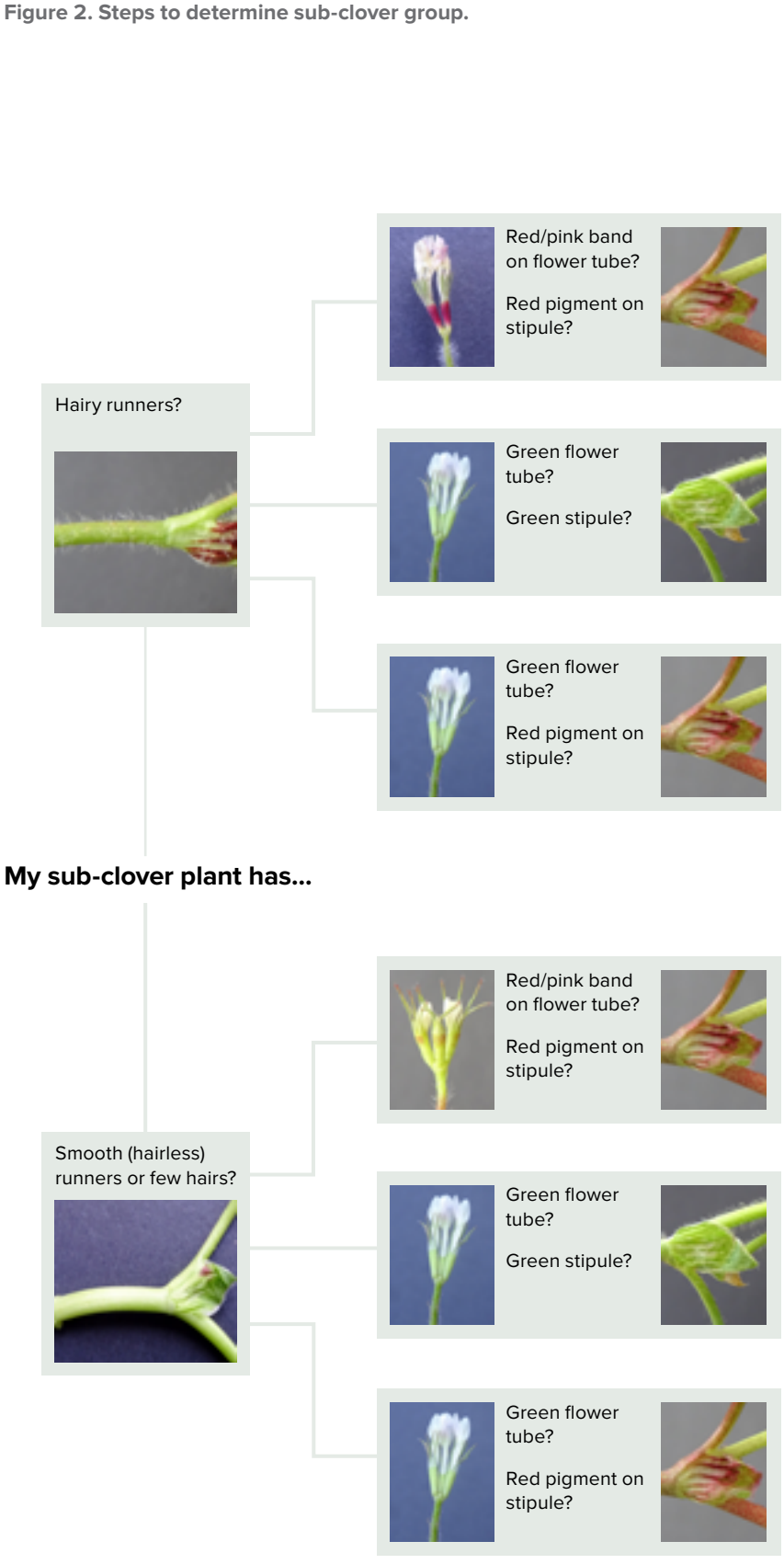
3. Stipule colour

Sub-clover plants have small leaves located at the base of the leaf stem called stipules. Markings will vary from green veins to red veins and may or may not have solid red colouring.

Stipule pigmentation:

1. veins green
2. veins red
3. veins red plus narrow red bar
4. red surface.

Figure 2. Steps to determine sub-clover group.



Cultivars by group

Hairy red group
- Daliak (1967), Esperance (1978) – similar
- Dalkeith (1983), Dwalganup (1952) – similar
- Dinninup (1962), York (1995) – similar
- Izmir$^{\Phi}$ (2005)
- Narrikup$^{\Phi}$ (2013)
- Mount Barker (1900)
- Bindoon$^{\Phi}$ (2010), Rosabrook$^{\Phi}$ (2011) – similar
- Geraldton (1959), Nungarin (1977), Northam (1976) – similar
- Urana$^{\Phi}$ (2002).

Hairy green group
- Howard (1964), Junee (1984), Tallarook (1935) – similar
- Bacchus Marsh (1937), Forbes$^{\Phi}$ (2019), Tammin$^{\Phi}$ (2017) – similar
- Seaton Park (1967/1994)
- Uniwager (1967).

Hairy combination group
- Leura (1991), Losa (2002), Mintaro$^{\Phi}$ (2007), Tarlee$^{\Phi}$ (2019) – similar
- Nuba (1990)
- Enfield (1982)
- Green Range (1984), Karridale (1984), Nangeela (1961) – similar.

Smooth red group
- Goulburn (1991)
- Yarloop (1947).

Smooth green group
- Mawson$^{\Phi}$ (2016).

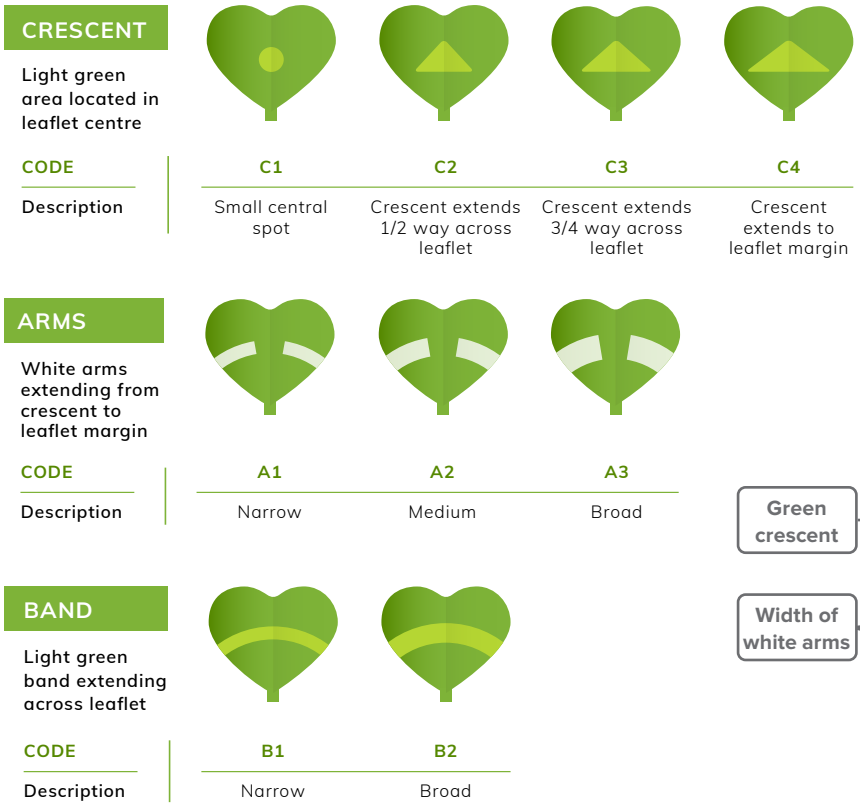
Smooth combination group
- Antas (2002), Coolamo $^{\Phi}$ (2005) – similar
- Monti$^{\Phi}$ (2012)
- Rosedale (1988)
- Clare (1955), Antillo$^{\Phi}$ (2019), Campeda (2002) – similar
- Denmark (1991)
- Woogenellup (1960)
- Larisa (1975), Trikkala (1976) – similar
- Gosse (1992), Meteora (1981), Napier (2003) Riverina (1995), Rouse$^{\Phi}$ (2017), Yanco$^{\Phi}$ (2003) – similar.

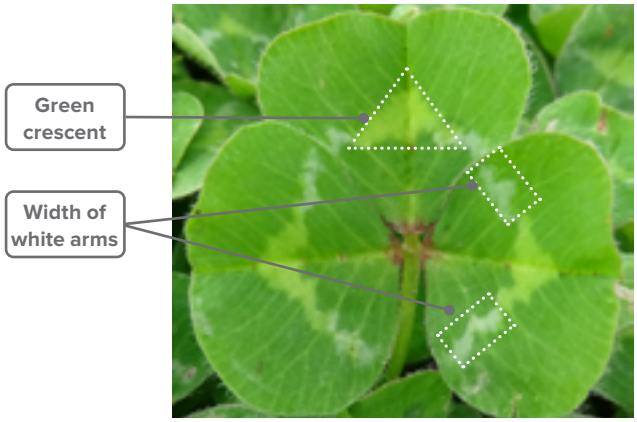
Notes:
- Oestrogenic sub-clovers are in written in red
- 'Similar' refers to leaf markings
- Years relate to cultivar release dates, but in some cases it was two years or more before seed was widely available.
- $^{\Phi}$ indicates this cultivar is covered by Plant Breeders' Rights.

Cultivar identification

Once the sub-clover group has been determined, other distinguishing features can be used to help identify individual cultivars. These distinguishing features are outlined in Tables 1 to 6 and the descriptions of these features are shared below.

Figure 3. Description of sub-clover trifoliate leaf markings.





Crescent and arms on sub-clover cultivar (cv) Trikkala (classed C2 A1-2).

Leaves

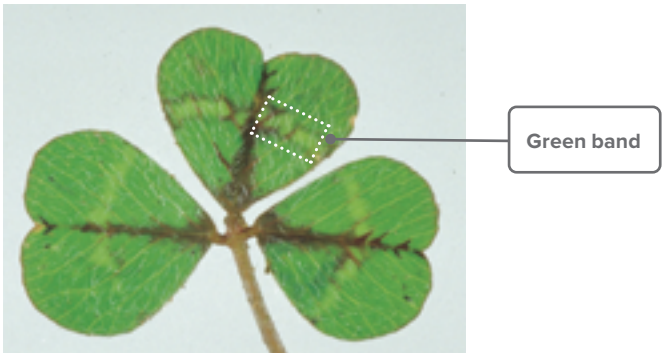
Leaf features can change from winter to spring and differences are often subtle. It is suggested identification based on leaves should be undertaken when the other distinguishing features have been assessed.

Seven leaf features are described below. Five relate to markings, one to shape and the other to hairs on the front of the leaflets.

Leaf markings

The five distinguishing leaf markings are outlined below.

1. **Crescents** are light green and located in the centre of the leaflet. They can be either a dot or triangular. Crescents are coded C, with the number one to four representing how far the crescent extends across the leaflet. Crescents are not present on seedlings and can fade during the late flowering stage.
2. **Arms** extend from the crescent to the edge of the leaf and are usually white. Arms are coded A and numbered according to their thickness, with 1 being narrow and 3 being broad.
3. **Bands** are a lighter green compared to the rest of the leaf. They are coded B and numbered 1 or 2 for narrow and wide bands, respectively.



Green band cv Geraldton (O) (classed B1).
Photos courtesy UWA and DPIRD

4 & 5. **Flecking** and **flushing** appear as black and brown marks on the leaves. They are caused by a leaf pigment (anthocyanin). They are more obvious in winter (cold temperatures), but may persist into spring. The position of flushing can also help in identification. Flecking and flushing tendency ranges from absent to very strong.

Strong brown flushing cv Trikkala.

Flecks and midrib flushing cv Mount Barker.

Leaf shape

Some cultivars have leaves with strong indentation that makes them look heart shaped. Other cultivars have more rounded leaflets. Leaf indentation is described from absent to very strong.

Strong leaf indentation cv Coolamon$^{\phi}$.

Rounded leaves cv Dwalganup (O).

Hairiness of the upper leaf, leaf stem and flower stem

All sub-clovers have hairs on the underside of the leaf, however, cultivars vary in their degree of hairiness on the upper leaf surface, leaf stem (petiole) and flower stem (peduncle), ranging from absent to very strong. The degree of hairiness on a cultivar can vary, but if there is none, then it can be successfully used as a distinguishing characteristic for identification.

Strongly hairy cv Tarlee$^{\phi}$ and absent hairs on upper leaf surface cv Clare.

The system used to describe increasing tendency of flecking, flushing, leaflet indentation and degree of hairiness is: absent, very weak, weak, moderate, strong and very strong.

Subspecies characteristics

In Tables 1 to 6, abbreviations BK, Yan and BR relate to the three subspecies groups of sub-clover: BK – *subterraneum*, Yan – *yanninicum* and BR – *brachycalycinum*. Subspecies *yanninicum* will have cream or tan-coloured seeds. *Subterranneum* subspecies have black or purplish-black seeds. *Brachycalycinum* can have either colour seed and has no red pigmentation on its flower tube, but is distinguished by long, thin flower stems used to hide burrs rather than actively bury them.

Long, thin flower stem of sub-species *Brachycalycinum* cv Antas.

Table 1. Hairy red group characteristics.

Cultivar	Release date	Flowering starts	Leaf features				Hairiness				Flower tube (calyx) pigmentation	Stipule pigmentation
			Crescent and arm marks	Flecking tendency	Flushing tendency	Leaflet indentation and distinctive features	Leaf upper surface	Leaf stem (petiole)	Runner	Flower stem (peduncle)		
Daliak (BK)	1967	Late Aug	C1	Moderate	Weak along midrib	Weak	Moderate	Weak	Moderate	Moderate	Upper ¾ calyx red	Most of surface red
Esperance (BK)	1978	Mid Sep	C1	Moderate	Weak along midrib	Weak	Strong	Moderate	Strong	Strong	Upper ¾ to whole calyx red	Red veins plus bar
Dalkeith (BK)	1983	Late Aug	C2 A1	Weak	Absent	Moderate	Moderate	Moderate	Strong	Strong	Top 1/4 calyx lightly pigmented	Red veins
Dwalganup (BK)	1952	Mid-late Aug	C2 A1 Arms steeply angled down	Weak	Moderate below leaf mark	Absent to very weak	Moderate	Moderate	Moderate	Strong	Top ¼ calyx lightly pigmented (absent under shade)	Red veins
Dinninup (BK)	1962	Early Sep	C3 A1 Crescent flattened	Absent	Moderate along midrib and outlining leaf mark	Absent to very weak	Weak	Moderate	Strong	Very strong	Upper ¼ to ½ calyx red	Red veins plus bar
York (BK)	1995	Early Sep	C2 A1 Crescent flattened	Absent	Weak partially lines the lower crescent mark	Weak	Absent	Weak	Moderate	Moderate	Upper ¾ to whole calyx red	Red veins to red veins plus narrow bar
Izmir$^{\Phi}$ (BK)	2003	Mid Aug	C3 A1 Arms faint	Absent	Moderate along midrib	Weak	Weak to moderate	Very weak	Strong	Strong	Upper ¾ calyx red	Red veins
Narrikup$^{\Phi}$ (BK)	2013	Mid-late Sep	C2 A3 Leaf pale green	Weak	Weak along midrib	Moderate	Weak	Moderate	Moderate to strong	Strong	Upper ½ purplish red	Red veins
Mount Barker (BK)	1900	Late Sep	C3 Mark distinct triangular shape	Moderate	Moderate along midrib	Weak	Weak	Moderate	Strong	Strong	Upper ¾ calyx red	Red veins plus bar to most of surface red
Bindoon (BK)	2008	Early Sep	C4	Weak	Weak along midrib	Weak to moderate	Weak to moderate	Weak	Strong	Moderate to strong	Upper ¾ of calyx red	Red veins
Rosabrook (BK)	2009	Late Sep	C4	Absent to weak	Weak along midrib	Weak	Weak	Absent	Weak	Absent	Upper ½ calyx red	Absent or weak red veins
Geraldton (BK)	1959	Mid-late Aug	B1	Weak	Moderate along midrib	Strong and distinctly spaced leaflets	Moderate	Moderate	Strong	Moderate	Upper ½ to ¾ calyx red	Red veins
Nungarin (BK)	1977	Early Aug	B2	Absent	Weak along midrib	Weak and narrow triangular leaflets	Strong	Moderate	Strong	Strong	Upper ¾ of calyx red	Red veins
Northam$^{\Phi}$ (BK)	1976	Mid Aug	B1	Absent	Absent	Moderate and leaflets may overlap	Strong	Weak	Moderate	Moderate	Upper ¾ calyx red	Red veins
Urana$^{\Phi}$ (BK)	2002	Late Aug	None	Absent	Moderate along midrib	Weak	Strong	Strong	Strong	Strong	Upper ½ calyx red	Red veins

Examples of widely grown cultivars in the hairy red group.

Bindoon$^{\phi}$

Dalkeith

Dinninup*

Dwalganup

Geraldton*

Mount Barker

Narrikup$^{\phi}$

Northam*

Nungarin*

Rosabrook$^{\phi}$

Urana$^{\phi}$

York*

* *Photo courtesy of UWA and DPIRD*

Table 2. Hairy green group characteristics.

Cultivar	Release date	Flowering starts	Leaf features				Hairiness				Flower tube (calyx) pigmentation	Stipule pigmentation
			Crescent and arm marks	Flecking tendency	Flushing tendency	Leaflet indentation and distinctive features	Leaf upper surface	Leaf stem (petiole)	Runner	Flower stem (peduncle)		
Howard (BK)	1964	Early-mid Sep	C1 A2	Weak	Moderate below leaf mark	Moderate	Moderate	Moderate	Strong	Strong	Green	Veins green
Junee (BK)	1984	Mid-late Sep	C1 A1-2	Weak	Moderate covering area below leaf mark	Moderate	Weak	Weak	Moderate	Weak	Green	Veins green
Tallarook (BK)	1935	Mid Oct	C1-2 A1	Moderate	Moderate covering area below leaf mark	Weak	Weak	Weak	Strong	Strong	Green	Veins green
Bacchus Marsh (BK)	1937	Mid-late Sep	C3-4	Strong	Absent	Moderate	Moderate	Strong	Strong	Strong	Green	Veins green
Forbes$^{\phi}$ (BK)	2019	Mid Sep	C3-4	Moderate	Weak along midrib	Weak	Strong	Weak to moderate	Strong	Strong	Green	Veins green
Tammin$^{\phi}$ (BK)	2017	Late Aug	C3-4	Moderate	Absent	Weak	Absent	Weak to moderate	Strong	Strong	Green	Veins green
Seaton Park and Seaton Park LF (BK)	1967 & 1994	Early Sep	C3 A2	Absent	Weak and narrow along midrib	Strong	Weak	Weak	Strong	Strong	Green	Veins green or very weak red veins
Uniwager (BK)	1967	Early-mid Sep	None	Absent	Absent	Moderate	Strong	Moderate	Strong	Strong	Green	Veins green

Examples of widely grown cultivars in the hairy green group.

Bacchus Marsh

Forbes$^{\phi}$

Junee*

Tallarook**

Tammin$^{\phi}$ #

Seaton Park or Seaton Park LF*

* *Photo courtesy of UWA and DPIRD*
** *Photo courtesy David Hollander, Lincoln University, NZ*
\# *Photo courtesy of Seed Force*

Table 3. Hairy combination group characteristics.

Cultivar	Release date	Flowering starts	Leaf features				Hairiness				Flower tube (calyx) pigmentation	Stipule pigmentation
			Crescent and arm marks	Flecking tendency	Flushing tendency	Leaflet indentation and distinctive features	Leaf upper surface	Leaf stem (petiole)	Runner	Flower stem (peduncle)		
Leura (BK)	1991	Early Oct	C2 A1	Weak	Weak along midrib or occasionally outlining leaf mark	Moderate	Strong	Weak	Moderate	Weak	Green	Red veins
Losa (BK)	2002	Late Aug	C1 (faint) A1 (faint)	Weak to moderate	Absent to very weak	Absent to very weak and leaflets small	Weak to moderate	Moderate to strong	Strong	Moderate to strong	Green	Red veins
Mintaro$^{\phi}$ (BR)	2004	Early Sep	C1 A1	Absent to very weak	Absent to very weak	Very weak to weak	Strong to very strong	Moderate to strong	Moderate	Moderate to strong	Green	Red veins
Tarlee$^{\phi}$ (BR)	2019	Late Sep	C1 A2	Moderate	Absent	Weak	Strong	Moderate to strong	Strong	Strong	Green	Red veins
Nuba (BR)	1990	Early Oct	C2 A2 Arms pale green	Absent	Absent	Weak	Absent	Moderate	Moderate	Strong	Green	Red veins
Enfield (BK)	1982	Mid-late Sep	C3	Moderate	Weak along midrib and outlining leaf mark	Absent to weak	Very weak	Weak	Moderate	Moderate	Green	Red veins
Green Range (BK)	1984	Mid-late Sep	C3 A2-3	Moderate	Weak can outline leaf mark	Weak	Very weak	Moderate	Strong	Strong	Green	Most of surface red
Karridale (BK)	1984	Late Sep	C3 A3	Weak	Weak can outline leaf mark	Weak	Very weak	Moderate	Strong	Strong	Green	Red veins plus narrow bar
Nangeela (BK)	1961	Late Sep	C3 A2-3	Very weak	Weak along midrib or outlining leaf mark	Weak	Very weak	Moderate	Strong	Strong	Green	Red veins

Examples of widely grown cultivars in the hairy combination group.

Enfield**

Karridale**

Leura

Losa^

Mintaro$^{\phi}$ ^

Tarlee$^{\phi}$

^ *Photo courtesy of Barenbrug Australia*
** *© State of Victoria, DEDJTR*

Table 4. Smooth red group characteristics.

Cultivar	Release date	Flowering starts	Leaf features				Hairiness				Flower tube (calyx) pigmentation	Stipule pigmentation
			Crescent and arm marks	Flecking tendency	Flushing tendency	Leaflet indentation and distinctive features	Leaf upper surface	Leaf stem (petiole)	Runner	Flower stem (peduncle)		
Goulburn (BK)	1991	Late Sep	C2 A1-A2	Absent	Weak may outline lower crescent mark	Strong	Weak	Weak	Absent	Weak	Upper 1/2 calyx red	Red veins
Yarloop (Yan)	1947	Early Sep	A1	Absent	Moderate along midrib	Weak	Weak	Absent	Absent	Absent	Top of calyx tube lightly pigmented brownish-pink in sunlight	Red veins plus narrow bar to most of surface red

Examples of widely grown cultivars in the smooth red group.

Goulburn

Yarloop

Table 5. Smooth green group characteristics.

Cultivar	Release date	Flowering starts	Leaf features				Hairiness				Flower tube (calyx) pigmentation	Stipule pigmentation
			Crescent and arm marks	Flecking tendency	Flushing tendency	Leaflet indentation and distinctive features	Leaf upper surface	Leaf stem (petiole)	Runner	Flower stem (peduncle)		
Mawson$^{\Phi}$ (BR)	2013	Early	C1 A1	Absent	Moderate along midrib and covering area below leaf mark	Very weak	Very weak	Absent to very weak	Absent	Absent	Green	Veins green or may have very weak red veins

Example of widely grown cultivar in the smooth green group.

Mawson$^{\Phi}$ ^

^ *Photo courtesy of Barenbrug Australia*

Table 6. Smooth combination group characteristics.

Cultivar	Release date	Flowering starts	Leaf features				Hairiness				Flower tube (calyx) pigmentation	Stipule pigmentation
			Crescent and arm marks	Flecking tendency	Flushing tendency	Leaflet indentation and distinctive features	Leaf upper surface	Leaf stem (petiole)	Runner	Flower stem (peduncle)		
Antas (BR)	1999	Early Oct	C1 (faint or absent) A1-2	Absent or very weak	Absent or very weak	Very weak to weak and large leaves	Moderate to strong	Moderate	Very weak	Moderate	Green	Red veins
Coolamon$^{\phi}$ (BK)	2004	Mid-late Sep	A3 with no crescent, then in late season C2	Weak	Absent	Very strong	Weak	Absent	Absent	Absent	Green	Red veins
Monti$^{\phi}$ (Yan)	2013	Early Sep	C1 A1	Moderate (on both sides)	Moderate along midrib and below leaf mark	Weak	Absent to very weak	Absent	Absent to very weak	Absent	Green	Weak red veins
Rosedale (BR)	1988	Mid Sep	C1 A2 Arms pale green	Absent	Absent	Weak	Moderate	Weak	Absent	Moderate	Green	Red veins
Clare (BR)	1955	Late Sep	C3 A2-3	Absent	Strong above and below leaf mark	Weak	Absent	Weak	Absent	Weak	Green	Red veins plus narrow bar
Antillo$^{\phi}$ (BR)	2019	Late Sep	C2 A2-3	Moderate	Absent	Weak to moderate	Absent	Very weak	Absent	Moderate	Green	Red veins
Campeda (BK)	2002	Mid Sep	C2 A2-3	Weak to moderate	Moderate to strong along midrib and below leaf mark	Weak	Very weak	Absent to very weak	Absent	Moderate	Green	Red veins
Denmark (BK)	1991	Late Sep	C2 A1-2	Absent	Absent	Weak and leaflets overlap	Weak	Absent	Absent	Absent	Green	Red veins
Woogenellup (BK)	1960	Mid-late Sep	C2 A2 Arms pale green	Weak	Absent	Strong	Weak	Weak	Absent	Moderate	Green	Red veins plus narrow bar to most surface red and stipules large
Larisa (Yan)	1975	Early Oct Identifiable from Trikkala by flowering time	C2 A2	Absent	Moderate covers area below and above leaf mark	Weak	Absent	Absent	Absent	Absent	Green	Red veins
Trikkala (Yan)	1976	Mid Sep	C2 A2	Absent	Moderate covers area below and above leaf mark	Weak	Very weak	Very weak	Absent	Very weak	Green	Red veins
Gosse (Yan)	1992	Late Sep	C4	Moderate	Moderate along midrib and area above leaf mark	Weak and leaflets overlap	Absent	Absent	Absent	Very weak	Green	Red veins
Meteora (Yan)	1981	Early Oct	C4	Moderate to strong	Moderate along midrib and (sometimes) area above leaf mark	Weak and leaflets overlap	Absent	Absent	Absent	Absent	Green	Red veins
Napier (Yan)	2001	Mid Oct	C4 A1	Weak	Moderate along the midrib and below leaf mark	Moderate and leaflets overlap	Absent	Weak	Absent	Absent to very weak	Green	Red veins plus narrow bar
Riverina (Yan)	1995	Mid Sep	C4	Moderate	Weak along midrib	Weak	Absent	Very weak	Absent	Very weak	Green	Red veins
Rouse$^{\phi}$ (Yan)	2017	Late Sep	C4	Moderate to strong	Moderate to strong along midrib	Weak	Absent	Absent	Absent	Absent to very weak	Green	Red veins
Yanco$^{\phi}$ (Yan)	2000	Mid Sep	C4	Moderate	Weak along midrib	Weak	Absent	Absent	Absent	Absent to very weak	Green	Red veins

Examples of widely grown cultivars in the smooth combination group.

Antas

Antillo$^{\phi}$

Campeda

Clare

Coolamon$^{\phi}$

Denmark

Gosse

Monti$^{\phi}$

Napier

Riverina

Rouse$^{\phi}$

Trikkala

Woogenellup

Yanco$^{\phi}$

More on oestrogenic sub-clover identification

Oestrogenic sub-clovers have features that reside in three groups and, unfortunately, have similar leaf appearance to non-oestrogenic cultivars. Additional descriptions are provided to distinguish between them.

Dwalganup, Dinninup and Geraldton

These oestrogenic sub-clovers are in the hairy red group (Table 1).

Dwalganup (O) and Dalkeith have similar leaf markings and close inspection is needed to observe a pale red pigmentation covering the top quarter of their flower tubes. This can easily be missed or absent under shade. Further differences between the two cultivars are:

- Dwalganup has white arms angled more steeply downwards than Dalkeith
- Dwalganup has brown flushing, Dalkeith has none
- Dwalganup leaf shape is more rounded, Dalkeith has moderate leaflet indentation (heart-shaped leaves).

Dalkeith (top) and Dwalganup (O) (bottom).

Dinninup (O) and York both have flattened crescents in spring and hairy flower stems. The main difference is that Dinninup has red pigmentation on less than half the flower tube, York has pigmentation covering nearly all the flower tube. They can also be distinguished by testing for oestrogenic content through tissue analysis.

Dinninup (top) and York (bottom).
Photos courtesy of UWA and DPIRD

Geraldton*

Northam*

Nungarin*

Geraldton (O), Nungarin and Northam have similar leaf markings, with no central crescent but green bands that extend across their leaflets. Differences are:

- Geraldton and Northam have thinner green bands compared to Nungarin
- Geraldton has tendency for some black flecking, which is absent in Northam and Nungarin
- Geraldton and Nungarin have spaced leaflets but Northam has broad and rounded leaflets.

Tallarook and Howard

These two oestrogenic sub-clovers exist in the hairy green group (Table 2).

Tallarook (O), Howard (O) and Junee all have similar leaf markings. However:

- Junee can be distinguished from Howard and Tallarook by its almost hairless flower stems
- Tallarook is late flowering, starting in mid-October, while Junee and Howard start flowering earlier in September
- Tallarook has moderately strong flecking tendency, compared to weak tendency in Junee and Howard.

Tallarook† (top) and Junee* (bottom).

Yarloop

Only two varieties, Yarloop (O) and Goulburn, are listed in the smooth red group (Table 4) but are easily distinguished by leaf markings.

* *Photo courtesy of UWA and DPIRD*
† *Photo courtesy David Hollander, Lincoln University, NZ*

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Information on older cultivars was drawn from: Collins WJ, Nichols PG, Barbetti MJ and Cooperative Research Centre for Legumes in Mediterranean Agriculture (1996) *Registered cultivars of subterranean clover: their characteristics, origin and identification.* Department of Agriculture and Food, Western Australia, Perth. Bulletin 4327.

Authors

Lisa Miller and Jess Brogden, Southern Farming Systems
Cam Nicholson, Nicon Rural Services

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MEAT & LIVESTOCK AUSTRALIA

Meat & Livestock Australia
Level 1, 40 Mount Street
North Sydney NSW 2060
Ph: 02 9463 9333
mla.com.au