Role and Management of HDL Break Crops in Dryland Cropping Rotations

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Overview:

- High Density Legumes (HDLs) offer a profitable 1 year (potentially 2 year) break crop option for cropping rotations, as an alternative to the traditional pulse break crop.
- HDLs offer greater flexibility in that they can be grazed, cut for hay/silage or green manured. They also have the potential to produce significant quantities of regrowth after cutting or grazing, extending the period of high quality green feed on offer after other pastures have dried off.
- HDLs offer substantial benefits to the following crop(s) in the rotation, including high nitrogen input, disease break and weed control (if managed correctly). Their superior economic returns, compared with pulses, depend on the grower's ability to rotationally graze HDLs throughout winter and spring (and early summer if the season permits), and/or the capacity to use or sell large quantities of hay or silage.

What are HDLs?

HDLs are aerially seeded annual legumes. There are many different species that come under this description, so selections should be made to suit your area. Consider soil type, maturity and hard seed levels. Generally the softer seeded varieties are better suited for a break crop situation. A mix of Elite II berseem clover, Laser Persian clover and Zulu arrowleaf clover was grown in the GRDC funded project at Wagga Agricultural Institute. *Note: large seeded forage legumes, such as vetch or field peas, may be better suited to more marginal areas where insufficient rainfall is received to get maximum production from HDLs. These tend to produce more dry matter in an average season than HDLs, but are generally not suitable for grazing and produce no regrowth. They may also be better suited where large quantities of silage/hay or green manuring are required.*

What advantages are there?

- ✓ Increase soil nitrogen, producing higher wheat and canola yields with lower (or no) nitrogen fertiliser costs.
- ✓ Increase late winter feed and take advantage of late spring regrowth to finish stock.
- ✓ Make silage or hay to improve, expand or supplement livestock enterprises, or sell off-farm.
- ✓ Manage herbicide resistance by cutting before weed seed set and reducing/eliminating chemical use.
- ✓ Increase returns compared with pulses.

HDL Agronomy

Paddock Selection

- Needs to be relatively free of weeds, particularly broadleaf weeds as HDLs are poor competitors as seedlings. A paddock that has been in crop for a couple of years should be okay.
- most HDLs prefer soil pH$CaCl_2$ > 5.0 for optimum production

Sowing Date

- early April (optimum) to mid May. Early sowing produces more dry matter for winter grazing and improves competition against weeds.

Sowing method

- seed is extremely small, so ensure it is placed with a light covering of soil. Rollers can ensure good seed/soil contact.
- inoculate seed.
- keep phosphorus and sulfur levels high. A small amount of nitrogen can help early growth in low fertility paddocks, (although may also encourage competitive grass weeds). Add molybdenum where necessary to encourage nitrogen fixation.
- a bare earth spray after sowing is recommended, or an early foliage spray as soon as insects appear. Check the label for registrations before use.

Economics - figure 1
(based on results of a 3-year GRDC funded project at Wagga Agric. Institute)

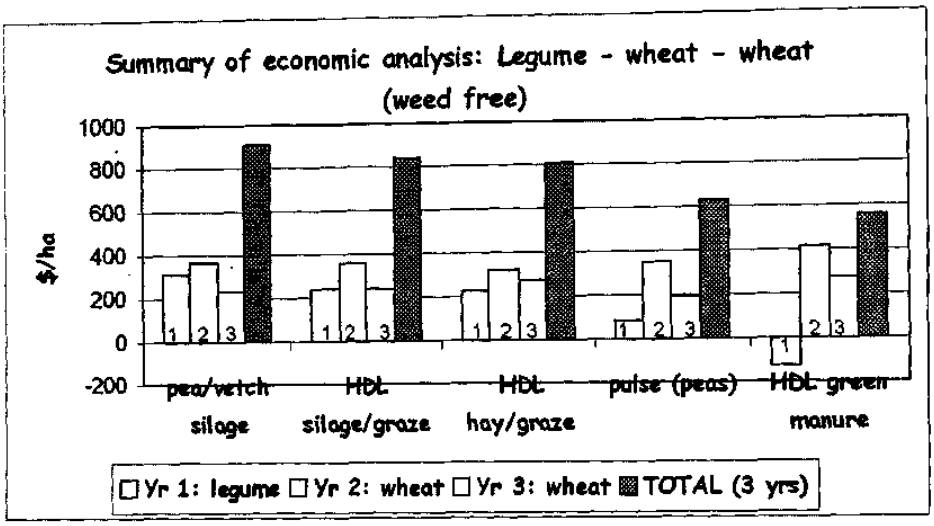
Note: 'Forage legumes' includes HDLs *and* large seeded forage legumes such as vetch.

Forage legumes can provide superior economic returns to pulses, provided growers have the ability to rotationally graze HDLs throughout winter and spring (and early summer if the season permits) and/or the capacity to use or sell large quantities of hay or silage.

Note that the grazing value of forage legumes through the season has not been evaluated in trials. Farmer experience has shown there is potential for this to provide significant economic returns. Demonstration sites are being established to support these observations (see case study below).

- Whilst yield benefits to following crops are greatest after green manuring forage legumes, the returns (or lack of, in the case of green manuring) from the initial legume year are such that forage legumes cut for hay or silage are a more profitable option in the longer term.
- Pea and vetch silage appears to be a more profitable option than HDL silage, which in turn is more profitable then HDL hay. Considering the value of silage in managing weed problems, forage legumes can play an important role in the economically viable management of herbicide resistance.

Figure 1 - 3 year returns comparing the economic benefits of HDLs, large seeded forage legumes and pulses in year 1.



HDL Grazing Case Study

*S&R **Hicks, Stockinbingal***

- wanted a HDL crop to help fill the winter feed gap before perennial pastures began their spring growth. Doubled as a break crop for the paddock which has a long cropping history.
- direct drilled a 10ha paddock with a HDL mix of Laser Persian clover (2.5 kg/ha), Zulu arrowleaf clover (2.5 kg/ha) and Elite II berseem clover (5 kg/ha) on the 2nd May. It was sown with 150 kg/ha single superphosphate. The seed was placed into moist topsoil to a depth of approximately 2.5 cm.
- the following stocking pattern was used on the paddock:
  1. 3 weeks in July: 335 ewes and 289 1st cross lambs
  2. 3 weeks in August/September: 300 lambs
  3. 2½ weeks in September: 400 ewes and 330 lambs
  4. 2 weeks in October/November: 400 ewes
  5. 10 days in December: 700 ewes
- paddock was to be sprayed out and sown to wheat in 2000, however prolific seed set coupled with good rain early in the year resulted in excellent germination of HDLs (predominantly arrowleaf) in the second year. They decided to leave the volunteer clovers in, allowing early grazing with 330 ewes and 330 1st cross lambs for 2 weeks in May-June. The paddock was then rotationally grazed for the remainder of the year. *Note that the summer rain which resulted in the 2nd year germination is not common - HDLs should generally be considered as a 1 year crop unless varieties are specifically selected for greater persistence.*

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