Cotton Catchment Communities CRC
NSW DEPARTMENT OF PRIMARY INDUSTRIES

COTTON *TALES*

Southern New South Wales

James Hill, Regional Cotton Extension Officer – 6993 1608, 0447 773 791

2008/09
No.7
19/2/09

Using Vetch in Rotation with Cotton

Vetch is an ideal winter green manure legume to grow in rotation with cotton.

Vetch can be sown either immediately following cotton picking (April – May) or following a wheat or early corn/sorghum crop from Mar – April, provided soil temps are cooling and around 20-25°C. There are 3 main advantages to planting vetch following a wheat or early summer crop compared to immediately after cotton:

- vetch can be planted in early autumn, allowing the crop to become established and increase in biomass prior to winter, during which it is very slow growing
- the soil moisture profile immediately following cotton will typically be very dry. May be hard to establish vetch without significant rainfall or irrigation
- allows more flexibility in sowing time – vetch can be planted anytime from Mar to Apr depending on when moisture is available and the crop can take advantage of any stored summer rainfall in the profile

Removing the crop prior to seed set (at 50% flowering) is important as vetch can become a weed problem if allowed to set seed. The variety Capello is recommended as it contains more soft seed than other varieties and has performed well in long term rotation trials at ACRI.

Vetch should be green manured at least 3 weeks prior to sowing the following cotton crop, to allow decomposition of the vetch stubble. Vetch is typically green manured by slashing and incorporating into the hill. An alternative no-till method has been researched at ACRI by Dr Nilantha Hulugalle where the vetch is slashed/mown and then the vetch lateral stems are cut using coulter discs. A follow up application of Sprayseed® ensures good control of the vetch. An implement has been designed at ACRI that allows the two operations of cutting with coulter discs and herbicide application to be completed in the one pass.

The vetch is then left to decompose on the surface. This method is suited to a min-till farming system or if the field is to be left fallow following the vetch crop. Research is indicating that there may be little difference in terms of N fixation, soil improvements or subsequent cotton yields between incorporating the vetch stubble or leaving it on the surface.

N fixation

Vetch is the most efficient commonly grown winter legume in fixing atmospheric N. Vetch typically produces 50kgN/ha/tonne of dry matter. Depending on sowing time and moisture availability, vetch can produce up to 4tonne/ha of dry matter, or 200kgN/ha (most of the following cotton crop N requirements). This N is initially present as organic N which is gradually converted to a form readily available to plants and is not as easily lost as other sources of applied N.

There may be some N tie-up associated with the decomposing organic matter which explains why there are reports of growers not seeing immediate benefits following a vetch crop. However, Dr Hulugalle suggests this is generally only noted in the first year of growing vetch and is not a problem in subsequent years.

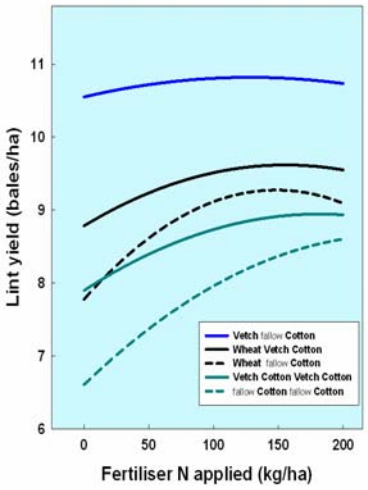
Soil health

Declining soil organic carbon (SOC) is a problem in most cotton growing soils. Green manure crops add organic matter to the soil which helps increase, or maintain SOC levels.

Another important advantage of vetch observed by Dr Ian Rochester and his team was that cotton grown after vetch was better at taking up N, P, K, Zn and Cu. Furthermore, its uptake of sodium was reduced. Additional experiments have shown vetch crops exude large amounts of organic acid from their roots. These acids can dissolve naturally occurring lime and gypsum in the soil, thereby improving soil structure. This improves root growth, nutrient availability, soil tilth and the water holding capacity of the soil.

Cotton yields

In a number of trials the rotation systems containing vetch commonly out yield the cotton-cotton and cotton-wheat systems.



Gross margins

Research by Dr Hulugalle, with economic analysis by Fiona Scott (NSW DPI) has shown that in situations of restricted water availability and on a whole farm basis, profitability was highest in a cotton-wheat-vetch system, followed by cotton-wheat > cotton-winter fallow-cotton > cotton-vetch-cotton. This was mainly due to the vetch fixing more N from a longer growing period (sown late Feb rather than mid May) and wetter soil profile at sowing. Savings in the subsequent cotton crop were from applying less N and less water due to improved soil structure. In general, the gross margins of a vetch rotation system in the Lachlan & Murrumbidgee will be largely driven by N fertilizer price and whether irrigation is required to grow the vetch over winter.

Disease

Vetch is an excellent break crop that has been shown to reduce the incidence of Black Root Rot. However, as with most other rotation crops it may increase the incidence of Fusarium Wilt.

Calculating N fixation from dry matter

- sample plants in 1m² area by cutting off at soil level
- cut into sections at place in large paper bags
- dry plants in oven at 60-70°C for 48hrs or leave in sun until crispy dry
- weigh sample to get biomass (g/m²)
- divide by 100 to convert to t/ha (e.g. 100g/m²=1t/ha)
- 1t/ha vetch dry matter=50kgN/ha
- to improve accuracy repeat in different areas of the field

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Day degree for the period 25th Sept to 19h Feb 2009

Met site	2008/ 2009	2007/ 2008	Average DD	Cold Shock 08/09 (ave)	Hot Shock 08/09 (ave)
Benerembah	1617	1655	1455	40 (48.8)	33 (25.3)
Hay	1604	1663	1509	36 (44.6)	34 (29.2)
Hillston	1718	1731	1591	31 (36.8)	43 (32.6)
Whitton	1628	1643	1451	39 (48.8)	35 (25.2)

Day degree for the period 5th Oct to 19th Feb 2009

Met site	2008/ 2009	2007/ 2008	Average DD	C/Shock 08/09 (ave)	H/Shock 08/09 (ave)
Benerembah	1545	1590.5	1405	34 (40.8)	33 (25.3)
Hay	1533	1595	1455	32 (37.1)	34 (29.1)
Hillston	1634	1657	1533	26 (29.9)	42 (32.5)
Whitton	1556	1580	1402	33 (41)	35 (25.1)

Note. Two DD tables illustrating difference in DD for 2 planting dates.

Upcoming Events

26/02/09	Cotton Industry Big Day Out Field Day, "Keytah" Moree
13/3/09	Hillston trial field walk with James Quilty & John Bennett (details TBA)
25/3/09	Defoliation field walk, Murrumbidgee (details TBA)
8/04/09	Lachlan & Murrumbidgee annual Cotton Field Day (details TBA)

Cotton Field to Fabric Training Course 21st – 23rd July 2009

Managing for quality through the production chain

This training course is designed to give participants an overview of the entire cotton pipeline from the farm to predicting fabric performance. It is recommended for people involved in any part of the cotton industry from growers to technologists and aims to give a better understanding of how segments of the industry operate and how each related to one another.

The course recently won the Cotton CRC 'Impact in Adoption' Award and comes highly recommended but places are limited due to the hands on nature **so get in early!** The next course will be held on the 21st-23rd of July at the CSIRO Textile & Fibre Technology Centre, Belmont, Victoria and costs $550 pp for the three days, including lunch each day and dinner on the Tuesday.

For more information please contact James Hill or Rene van der Sluijs on 03 52 464738 or Rene.vandersluijs@csiro.au.

Lachlan & Murrumbidgee Crop Competition 2009

Entry forms are attached for the 2009 Cotton Growers Crop Competition. The judging date is to be announced yet most likely to take place in the first week of March.