NSW Agriculture Plant Disease Notes

PHDS Wagga Wagga News
June 2004

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- Club root – a new disorder of canola and mustard
- Soil borne diseases – what's the latest PART 1 (Stubble retention and direct drilling in Central China and Wagga Wagga – there is a link!)

WATCH FOR

Poor early growth of cereal crops may be caused by Rhizoctonia or Pseudomonads, amongst other possibilities.

Look for poor patches in your paddock. Check roots for discolouration and poor growth.

Comments on our delivery of service and how we can improve it are always welcome. We also welcome your comments on aspects of the service you like!

PLEASE ADVISE EDITOR IF YOU DO NOT WISH TO RECEIVE THIS NEWSLETTER.

PHDS Wagga Wagga News Editor: Kerry Wratten, NSW Agriculture, Wagga Wagga Agricultural Institute, PMB, Wagga Wagga, NSW 2650; phone (02) 6938 1877; fax (02) 6938 1822; email kerry.wratten@agric.nsw.gov.au
Contributor: Dr Gordon Murray (above address); email gordon.murray@agric.nsw.gov.au

Beet western yellows update

The canola virus in 2003

Background
Beet western yellows virus (BWYV) is a disease which affects canola. It has a host range of around 150 other plant species including wild radish, wild turnip, shepherd's purse, field peas, soybeans, faba beans, chick peas and subclover. The virus is carried by the green peach aphid and is transmitted by the feeding action of the aphid. Yield losses to BWYV are uncertain as aphid numbers vary widely between locations and between years. Over the last few years we have surveyed the incidence of the virus in canola commercial crops in southern NSW and NE Victoria. Here are our findings:

Key Points

- In 2003, 23 paddocks were tested for the presence of *Beet western yellows virus*.
  - 82.6% of farms tested positive.
  - Out of 23 paddocks tested, 4 paddocks tested zero, 10 paddocks had between 1% and 7% of plants infected, and 9 paddocks had between 27% and 91% plants infected with the virus.
  - The average level of inoculum was 25% of plants infected.
- In 2002, 47 paddocks were tested.
  - 100% of farms tested positive for the virus.
  - The incidence ranged from 2% infection in some paddocks up to 83% in others.
  - The average level of infection was 40.6%

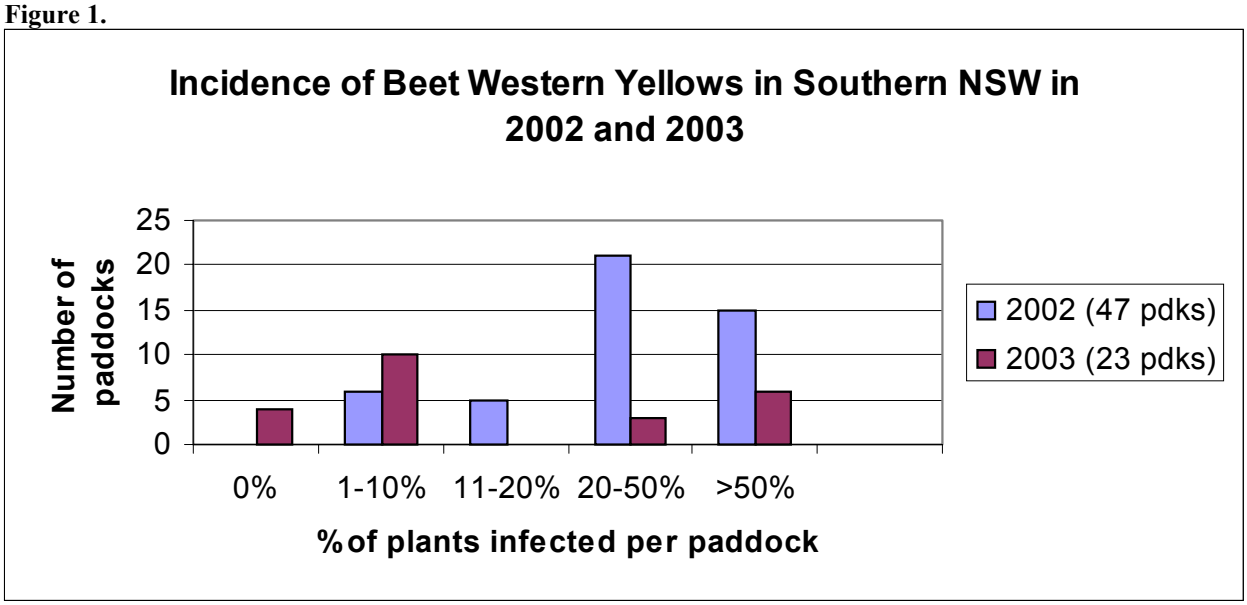
As observed in 2002, the visual symptoms in plants in 2003 came back with no relationship to the level of virus or the presence of the virus. Over 90 plants showing visual symptoms such as stunting, reddening, cabbage-like growth (thought to be related to viral infection), failed to show any presence of BYWV when tested. This highlights the difficulty in using visual symptoms to determine the presence of the virus.

Again in 2003 there was no geographical area more affected than another. The survey covered roughly the same area in both years from Rutherglen in the south to Thuddungra/Boorowa in the north. The only difference being fewer paddocks was tested in 2003.

As can be seen from the findings above BWYV is widespread and common in canola crops. In both years the majority of paddocks had infected plants. In both years there were severe infections in several paddocks.

The graph below shows the 2002 infection levels were higher than in 2003 (Figure 1). There were higher numbers of infected 'plants per paddock' in 2002 – 21 paddocks in the 20-50% of plants infected and 15 paddocks in the greater than 50% of plants infected. Compare this to 2003 where the majority of paddocks (10) were in the 1-10% plants infected. Note that only half the number of paddocks were sampled in 2003. This was because the survey was targeting other issues. In 2003 there were still 6 paddocks in the high infection rate per paddock (<50%).

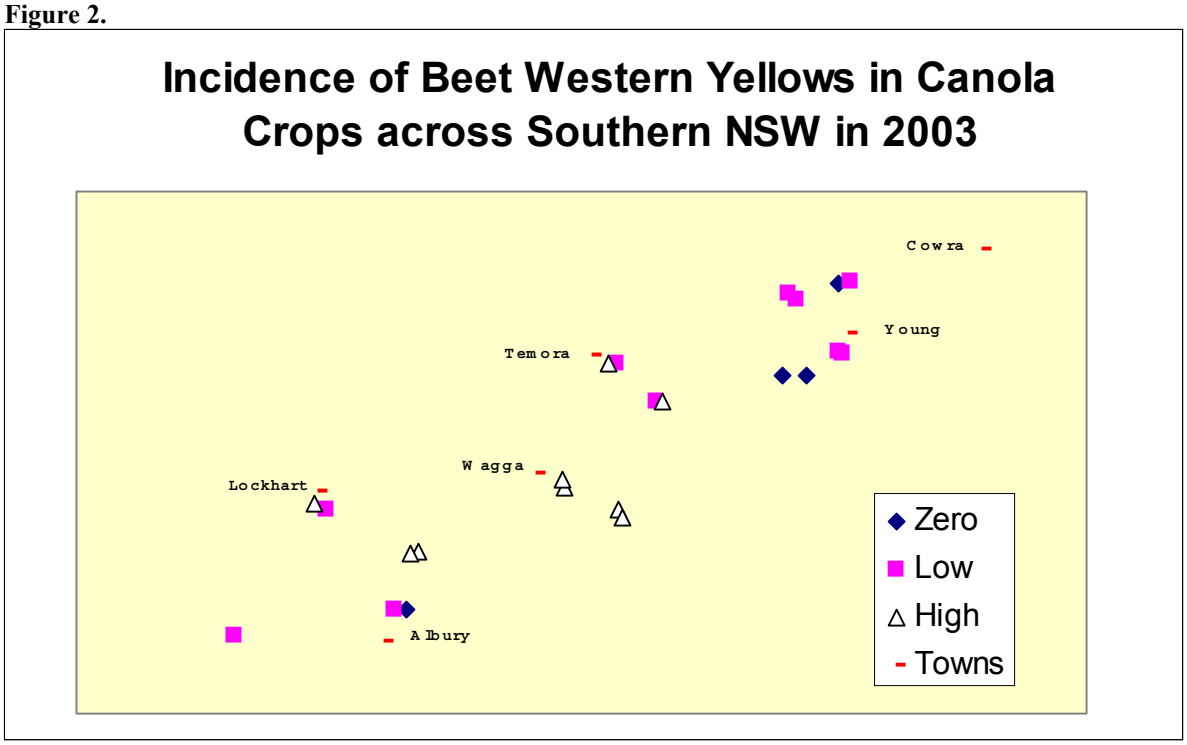
Figure 1.



This graph (Fig 2.) shows the incidence of BWYV across the state in 2003.

- As mentioned before the area surveyed in both years was the same.
- In both years the virus was found to be evenly spread across southern NSW and NE Victoria.
- In 2003 the highest levels appeared to be in the centre of the survey area.
- In 2002 the high levels of infection were evenly distributed across the survey area.
- Farms with zero levels of infection in 2003 were mainly in the north, with one site testing zero in the south.
- Low incidences of the virus were spread across the region.

Figure 2.



For more information on the canola virus contact Fleur Lewington on: 0269 381 931 or Kerry Wratten: 0269 381 877

Clubroot in canola – a new disorder to look out for

Clubroot in Mustard and Canola

By: Tamrika Hind-Lanoiselet and Paul Parker

Introduction

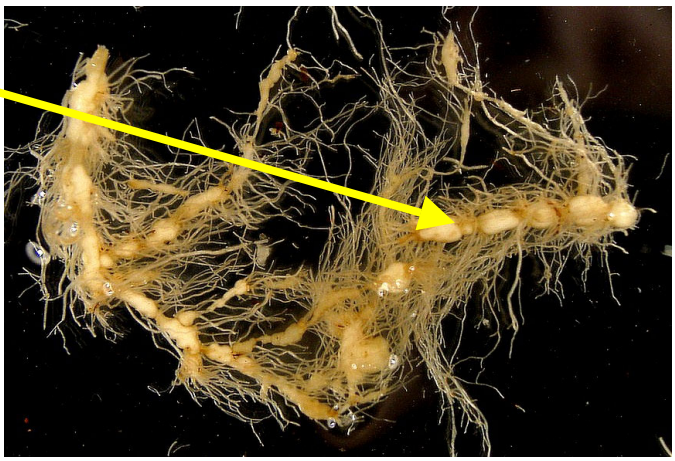
Clubroot is caused by the soilborne fungus *Plasmodiophora brassicae*. The disease occurs worldwide and only affects plants in the Cruciferae family including canola, mustard, cabbage, cauliflower, brussel sprouts and broccoli. Internationally, clubroot can cause yield losses of up to 50% in canola and it is considered a serious disease in Britain, Canada, Czechoslovakia, France, Germany and Sweden.

In Australian vegetable brassicas, clubroot is widespread and causes significant yield losses. The Australian oilseed industry has been somewhat protected from clubroot. This is because the major production areas for vegetable and oilseed brassicas are

usually separated from one another, posing a very low risk for the fungus to spread from vegetable to oilseed brassicas. In addition most Australian pathotypes of clubroot are only able to cause disease in the warmer months, with the exception of pathotypes in Tasmania and some parts of New South Wales where disease is observed year round.

However, in 2003, two confirmed cases of clubroot were found on white mustard (*Sinapis alba L.*) in New South Wales, Australia. This is concerning, as both of these cases were severe and occurred in areas that were distant from vegetable growing areas and during the cooler winter months. Australian oilseed growers should now be on the lookout for symptoms resembling clubroot. Ensure plants suspected of having clubroot are sent to a plant pathologist for correct identification.

Swollen and galled roots



Symptoms

Swollen, galled roots are the most typical symptom of infected plants. This ranges from tiny nodules, to large, club-shaped outgrowths that may involve most of the root system. The galls are at first firm and white but become soft and greyish brown as they mature and decay. Affected roots have an impaired ability to assimilate water and nutrients, therefore severely affected plants can be stunted and wilt under moisture stress. The two severely infected white mustard fields in Australia also had extensive leaf lesions that resembled symptoms of extreme nutrient deficiencies.

Control

In the Australian vegetable brassica industry several methods of control have been developed that may be useful for oilseed brassicas.

- **5 year rotation**: Infested fields must be kept free of susceptible crops and weeds for at least 5 years, to allow sufficient natural decay of the long-lived resting spores.
- **Control Brassica weeds**: Brassica weeds are susceptible to clubroot and can maintain soil inoculum levels in non-brassica crops.
- **Monitor equipment movement**: Do not move cultivating equipment from infested to non-infested areas before thoroughly cleaning the equipment.
- **Liming**: Clubroot thrives in acid soils (pH <7.0) and liming to increase soil pH (7.0-7.5) has been successful for vegetable brassicas but will be cost prohibitive in most oilseed brassica areas.

Who to contact for more information:

Tamrika Hind-Lanoiselet or Paul Parker can give you more information about this problem. Tamrika would like to receive samples of any suspect plants. Please send whole plants with some soil attached to:

Tamrika Hind-Lanoiselet, NSW Agriculture, PMB, Wagga Wagga NSW 2650.

Tamrika's phone number is: 02 6938 1608 Paul's phone number: 02 6382 1077

Soil borne diseases - what's the latest

Stubble retention & direct drilling in Central China and Wagga Wagga

Gerard O'Connor
NSW Agriculture, Wagga Wagga Agricultural Institute

Reduced early growth of direct drilled wheat is being investigated at WWAI as part of an Australian Centre International Agricultural Research (ACIAR) funded project. The federal government assists development of agricultural systems in Australia and a partner country via such ACIAR projects. NSW Agriculture is part of a major project collaborating with Chinese scientists and producers to research stubble retention and direct drilling in Gansu Province, in central China. This region was chosen as its farmers are regarded among the most impoverished in China.

In the current system, stubble is a valuable resource providing food and bedding for livestock and fuel for cooking and heating (see photo on next page). Regular tillage is practiced from harvest onward, in part to assist infiltration. Yet this tillage has contributed to erosion. The Gansu Province presently contributes substantial sediments to the "Yellow River". Our aim is to display the benefits stubble retention and reduced tillage can have on soil structure, infiltration, crop yield and thus income.

This research project is timely, as China's central government has recently moved to "encourage" similar objectives nationally. However, such a general decree may encounter problems. Australian farmers and scientist have encountered and addressed many problems while adopting conservation tillage and stubble retention systems and it is these skills which are being used to assist the Chinese through the challenging transition.

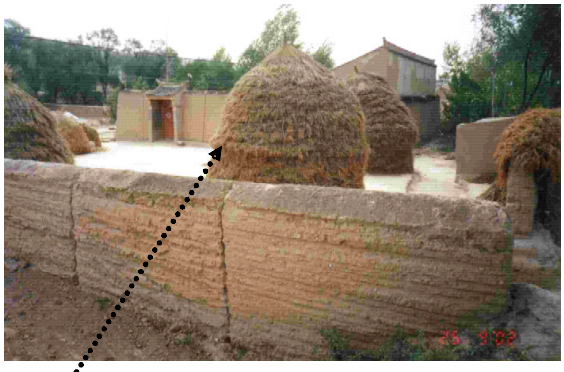
It is interesting to encounter the same comments and barriers within China as occurred in Australia. A roadside site was chosen for one experiment to encourage farmer interest. Comments during the first sowing from the many interested observers reputedly included "lazy farmers", "very messy" and disastrous consequences on yield were predicted. All this acted to focus farmer interest and as our Chinese colleagues established and maintained the plots, observers were numerous. Fortuitously the first season was relatively dry and the stubble retained treatments topped the yields. By year 2 a few locals experimented within their plots with these "lazy farming" methods and now farmer interest in stubble retention and direct drilling is expanding rapidly.
China is experiencing massive changes with rural labour supply projected to diminish rapidly. Increased availability of alternative energy sources such as natural gas and the ever-expanding electrical grid are increasingly impacting on established stubble removal practices. Mechanisation is infiltrating the farming systems of even these most impoverished farmers. During such an adoption phase, Australian farmers encountered problems with machinery design, which restricted where direct drilling could be utilised. Development of new seeder designs led to effective solutions for most situations. The opportunity exists to include such stubble friendly machinery as the first option for Gansu farmers. Our role is to facilitate the adoption of stubble retention, minimum tillage systems and pre-empt possible limitations to farmer adoption. Any difficulties encountered in the early stages could undermine farmer support, thus one aspect of our project is predicting possible limitations.

In Australia, direct drilled crops can suffer from reduced early growth compared to conventionally tilled crops. This phenomenon has been recorded across cropping regions and has been investigated from several angles. Recently pseudomonad bacteria have been implicated in a causative role in reducing root development of direct drilled crops (Simpfendorfer et al. 2001). Further investigation of the mechanisms whereby pseudomonads influence wheat seedling vigour is one aspect of the Wagga component of is ACIAR project.

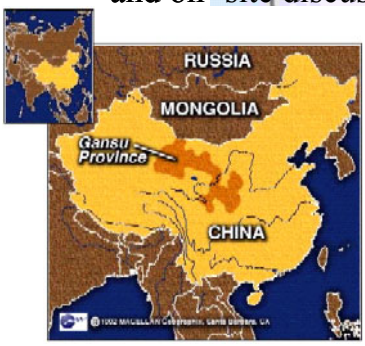
To date climatic conditions have conspired to produce small yield responses for direct drilled treatments compared to conventional tillage during 2003 experiments in Australia and thus far reduced early growth has not been encountered within the Gansu experiments. This season the majority of NSW has experienced NIL early growth and now farmers are confronted with little option but to direct drill to ensure timely sowing.

Next issue of this newsletter will include a closer look at how and why pseudomonads may reduce seedling growth of direct drilled wheat.

Contact Gerard if you would like some more information on this ACIAR project with China. Phone: 0269 381607.



Above, traditional harvest and stubble management technology.
Below, experimental plots with direct drilled stubble retained treatments and on -site discussions by Chinese and Australian scientists.



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