

Apron XL Seed Dressing Demonstration

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Aim

To evaluate whether Apron XL improves crop establishment, root development and yields in field pea crops by protecting seedlings against the early effects of root diseases.

Background

Apron XL is a Fungicidal Seed Treatment containing 350 g/L Metalaxyl-M. It is registered for the control of Damping Off caused by *Pythium* and for control of Downy Mildew in peas.

Although Downy Mildew is not a common problem in the Central Wheatbelt, *Pythium* has been found to be widely spread across cropping soils and although it is generally more prevalent in areas with annual rainfall greater than 350mm, it is by no means confined to these areas. In fact, new research has found that high rainfall or cold waterlogged soils are NOT a prerequisite for *Pythium* infection.¹ High incidences of root rot have been recorded in periods of drought - conditions not previously considered conducive to development of *Pythium* diseases. Even in the absence of Damping-Off (above ground) symptoms, *Pythium* has been found to reduce yield significantly through the damage it causes to the roots. A secondary effect is the increased susceptibility to other root and fungal diseases caused by the overall reduced plant health. Out of 141 Predicta B Root Disease tests carried out throughout WA in 2010, 94% were positive for *Pythium*.

Seed dressings are a highly effective means of managing disease during the development stage of a crop. Depending on the season, Apron XL can be expected to protect seedlings against fungal disease for up to five weeks after emergence. In 4 trials in South Australia Apron XL increased yield by an average of 318kg/ha.

Trial Details

Property	Rob Nankivell, East Maya
Plot size & replication	Seeder Bar Width x Length of Paddock
Soil type	Red Loam
Soil pH	7.3
EC	0.12 ds/m
Sowing date	28/5/2010
Seeding rate	100 kg/ha
Fertiliser	60 kg/ha MAP
Paddock rotation	05 Field Peas, 06 Wheat, 07 Wheat, 08 Wheat, 09 Wheat
Herbicides	0.1 L/ha Brodal®, 0.1 kg/ha Metribuzin, 0.2 L/ha Select, 0.075 L/ha Targa®
Growing Season Rainfall	141mm

Table 1: Treatments.

Site	Trmt	Herbicide Treatments	Fungicide Treatments
A	3	Terbyne (1.4 kg/ha) + Glyphosate (1 L/ha)	Nil
A	4	Terbyne (1.4 kg/ha) + Glyphosate (1 L/ha)	Apron XL
B	1	Diuron (1 kg/ha) + Metolachlor (1 L/ha) + Glyphosate (1 L/ha)	Nil
B	2	Diuron (1 kg/ha) + Metolachlor (1 L/ha) + Glyphosate (1 L/ha)	Apron XL
C	Nil	Rest of paddock	Apron XL

Results

Table 2: Yield and percentages of yield improvements of field peas treated with ApronXL compared to untreated peas.

Treatment	Yield (t/ha)	Percentage yield improvement over untreated (%)
1 Untreated	0.84	-
2 Apron XL	1.05	25%
3 Untreated	0.86	-
4 Apron XL	1.00	17%

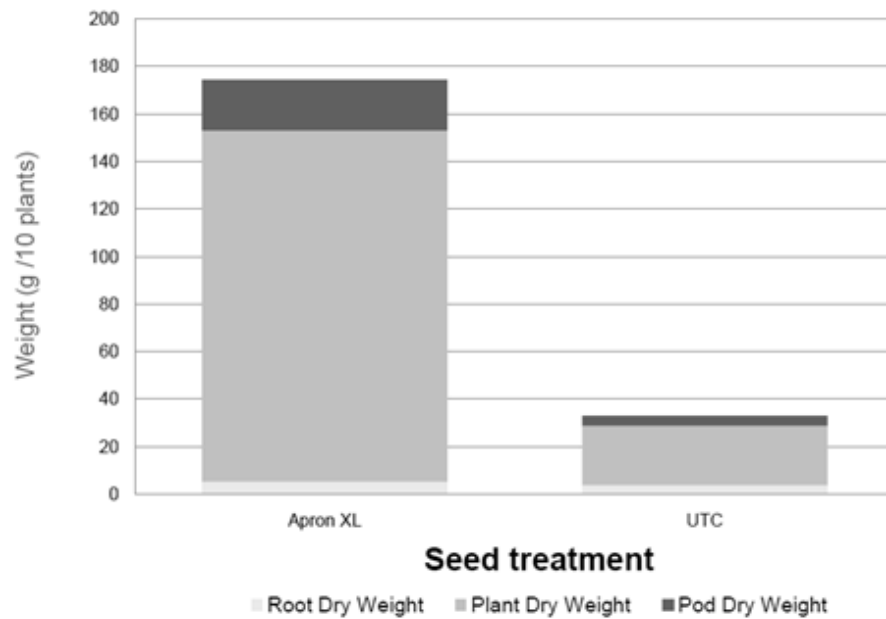
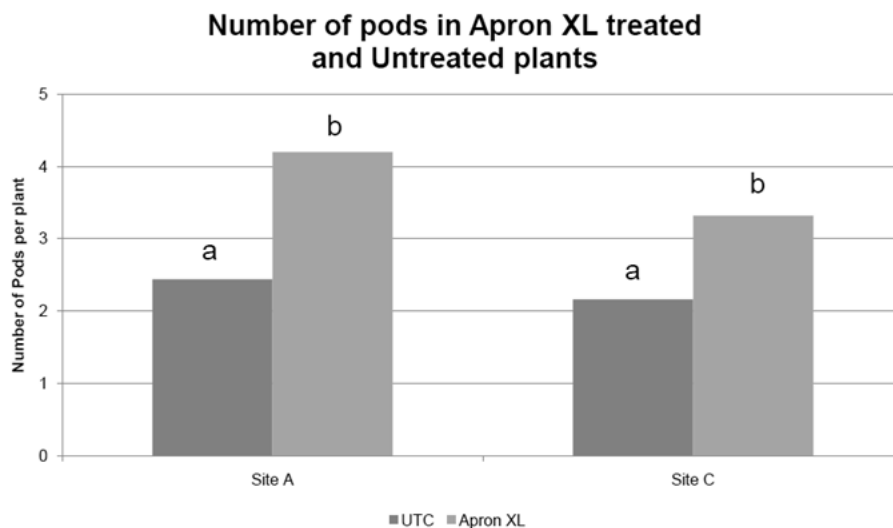


Figure 1. Plant weights (g/10 plants) recorded at site A.



Significant increase ($P = <0.05$) in pods recorded in each paddock.

Site A: t stat (2.44) > t critical (2.08) therefore $P = 0.02$

Site C: t stat (4.22) > t critical (2.06) therefore $P = 0.0003$

Figure 2. Number of pods in Apron XL treated and untreated plants.

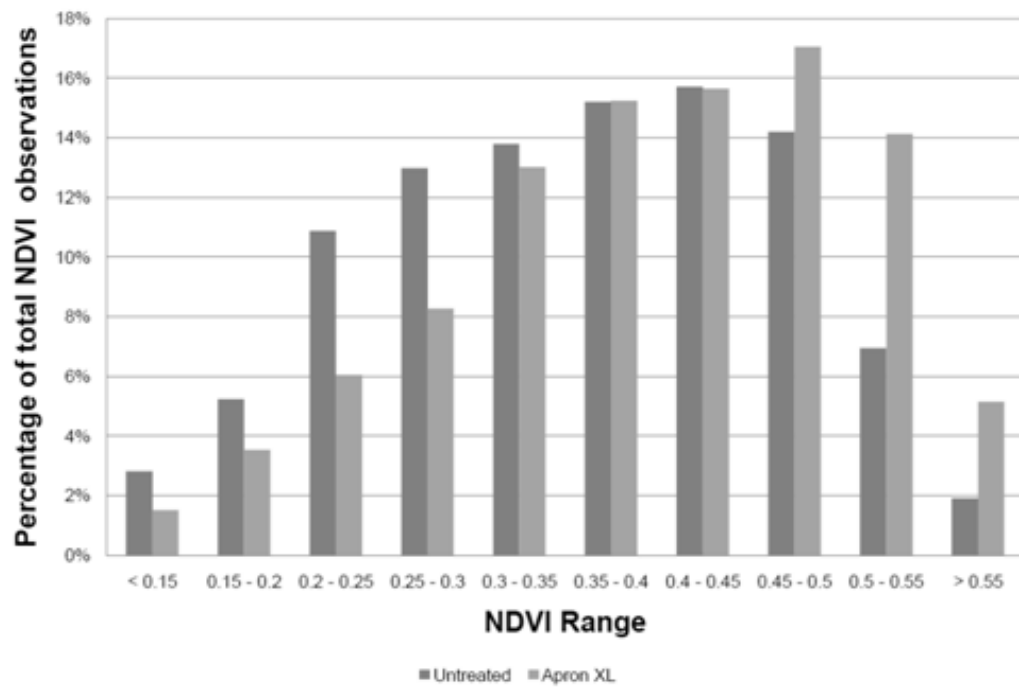


Figure 3. Histogram of NDVI scores recorded at Site A.

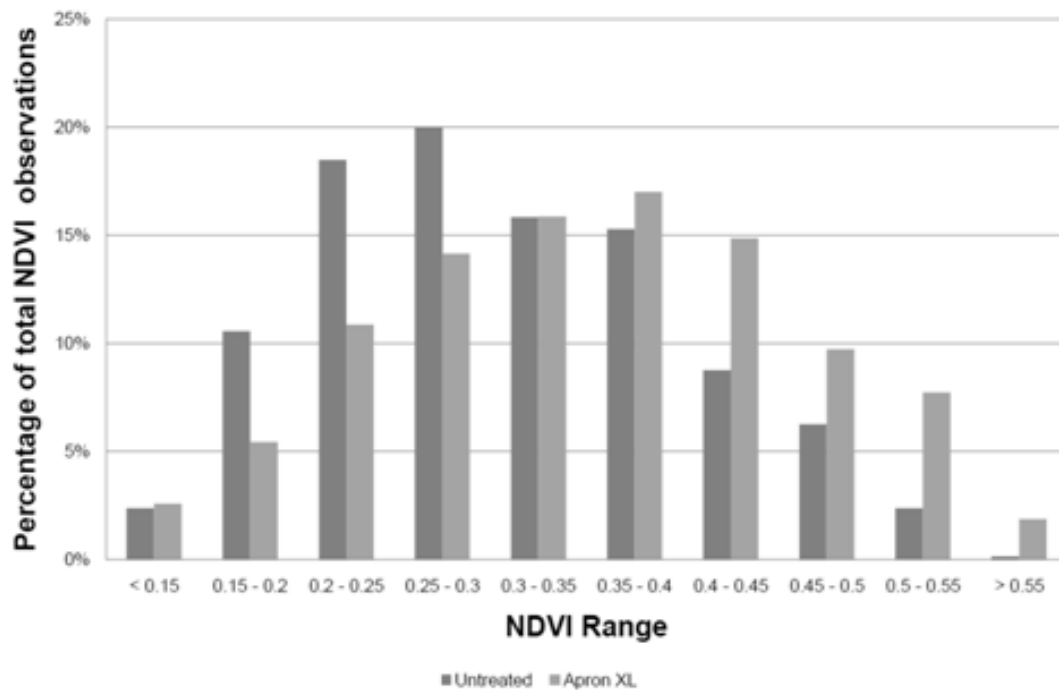


Figure 4. Histogram on NDVI scores recorded at Site B.

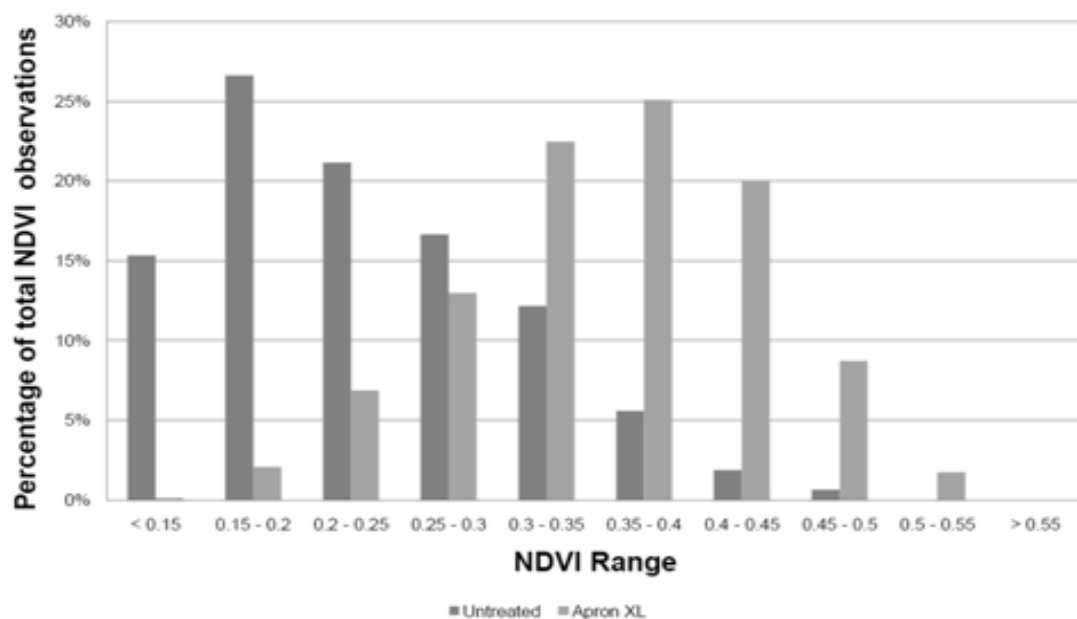


Figure 5. Histogram of NDVI scores recorded at Site C.

Visual Biomass comparison

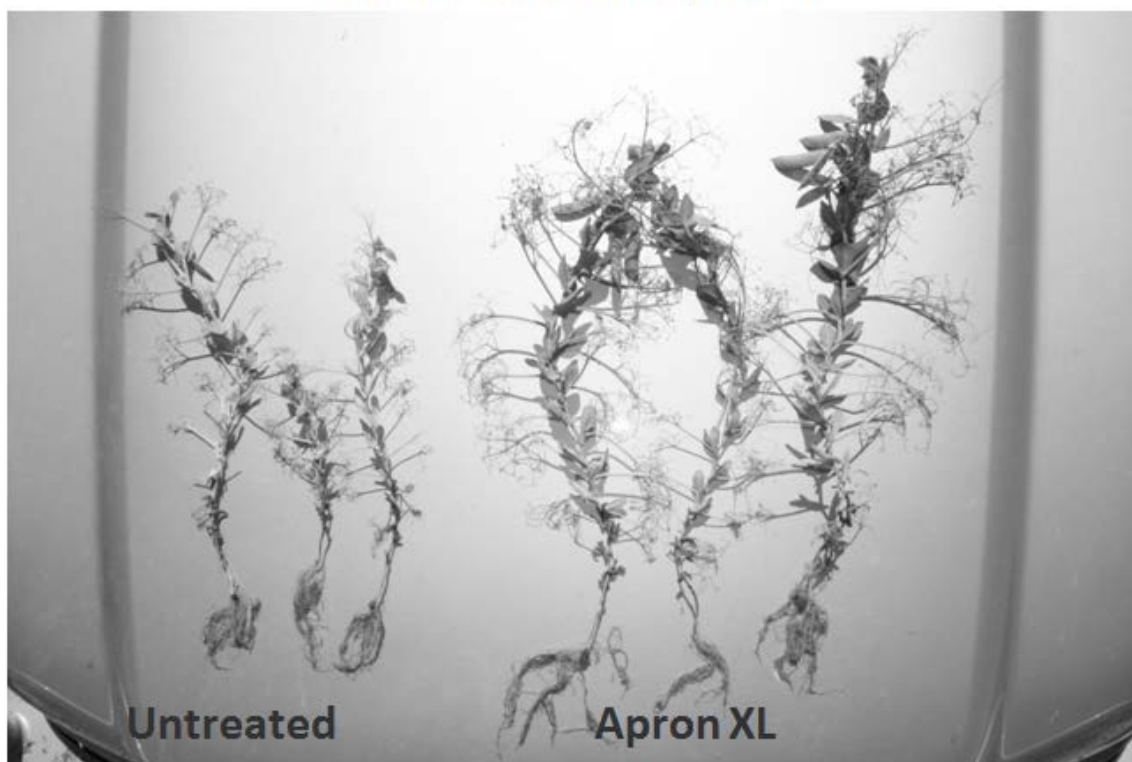


Photo - Paul Chatfield 21/09/10

Figure 6. Visual Biomass comparison of field peas treated with Apron XL and Untreated.

Comments

NDVI is an index which represents the “greenness” or relative biomass of a crop, with values closer to 1 reflecting a high chlorophyll density indicating lush, healthy crops. The closer the score is to zero, the lower the density of chlorophyll, either as a result of lower biomass or reduced crop health (yellowish looking crop). NDVI has been used to measure differences in biomass as it takes human error or subjectivity out of the equation. As can be seen in the histograms above, there is a clear difference in biomass between the untreated crop and the crop treated with Apron XL, with a shift to higher NDVI scores in the Apron XL histogram.

Final yield was disappointing given the crop’s potential at the beginning of September. As with most crops in the state, another 20mm fall was probably all that was required for a hugely improved yield.

Tissue testing by DAFWA showed *Fusarium* Stem & Root Rot (*Fusarium* spp.) present in all samples, both treated and untreated. The Apron XL treated plants appeared to have withstood the infection somewhat better than the untreated plants. There could be many reasons for this but a strong possibility is that an early infection from sub-clinical levels of *Pythium* may have caused a degradation in the root system of the untreated plants and made them more susceptible to the effects of the *Fusarium* infection. This *Fusarium* infection manifested itself late in the season, with blackened pea crowns restricting water flow to already drought stressed plants and as a result impacting on pod fill. The Apron XL treated plants may have had their roots better protected against the early infection and were better able to withstand later infections and access available moisture. *Pythium* strips away the fine root hairs from the root which will have a significant impact in lower rainfall seasons, reducing the surface area of the plant’s root and reducing the roots ability to access soil moisture.

Another interesting observation was a substantial infestation of *Heliothis* grubs during one of our trial inspections. The grubs were present in large numbers in the Apron XL treated crop, but were barely touching the untreated crop.

Rob Nankivell commented that the Apron XL treated peas were much less prone to lodging and so were significantly easier to harvest.

Acknowledgements

¹ Root Disease Fact Sheet, GRDC, Paul Harvey, CSIRO

Paper reviewed by Lyndon May, Syngenta Seedcare Manager SA/WA & Paul Chatfield, Syngenta Technical Services Lead WA

Contact

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