PRIME HARD IN THE SOUTH
THE 1998 SEASON

This workshop was arranged with the aim of evaluating the outcome of the 1998 growing season and of the practical implementation of the ‘Prime Hard in the South’ project. It involved contributions from the range of people involved in the research and implementation stages.

This report provides a limited record of the proceedings of the workshop in the form of notes taken during presentation and copies of the overhead transparencies provided by many of the speakers.

IN SUMMARY ...
Speakers at the workshop presented a positive reaction to the implementation of the Prime-Hard-in-the-South project. Even growers who failed because of the frost said they know how to achieve Prime-Hard protein with high yields, and that they will use this information to try again if the season is right.

PRESENT:--

A WB: Bob Cracknell
CSIRO: John Angus, Colin Wrigley
QWCRC: Bill Rathmell, Clare Johnson
Fertiliser Co’s: Tony Good, Matt Hallam, Jim Dehannan
GRDC: Dale Baker
Growers: John Derick, Alwyn Collins, John Coghlan
NSW Agriculture: Martin May, Helen Allen, John Oliver, John Brennan, Paul Parker,
Jennifer Apps, Peter Martin, Paul Lukins, Kirrily Smith, Greg Condon
Private Consultants: Owen Bolinda, Geoff Pitson, Terry Horan, Chris Duff, James Madden
The Land Newspaper
Program for the day

10.00  INTRODUCTION - Martin May, NSW Agriculture

10.05  FERTILISER ASPECTS - Tony Good (Incitec) and Matthew Hallam (Pivot)
Overview of the 1998 growing season. Basal and topdressing.
Where was the late N topdressed in 1998?
Where / how much were the crop responses in 1998?

10.30  BUYERS and USERS
The AWB view - Bob Cracknell
Domestic millers - Report from John Dines (Goodman Fielder, Toowoomba)

11.00  ADVISERS’, CONSULTANTS’ AND RESELLERS’ FORUM
- Owen Boland (Temora), Chris Duff (Young), Geoff Pitson (Cootamundra), James Madden (Lockhart), Paul Lukins (Conobolin), Terry Horan (Temora)
What information did farmers use to base decisions?
What more information is needed for the new PHS regions?
What are the lessons for extending further south?

12.00  FARMERS’ FORUM
- Alwyn Collins (Walla Walla), John Coghlan (Cudal), Don Piccollo (Tullibgechal), Daryl Harper (Ariah Park)
Comments from growers from diverse regions who aimed to produce PH in 1998
Reasons for decisions. Success / failure

1.00   LUNCH

2.00  CONCLUSIONS SESSION - Chairman Bob Cracknell
• Lessons for grain buyers
• Lessons for advisers
• Lessons for farmers
• Lessons for NSW Agriculture
Extent activities needed for 1999 season.
The CSIRO Decision Support System for N management - John Angus
Quality results from the PH in South trials - Helen Allen
Results expected for the wider range of wheats - Reports from John Skerritt (CSIRO Plant Industry, Canberra)

3.00  "PH in SOUTH" IMPLEMENTATION GROUP
Extension booklet for 1999.
REPORTING ON THE OVERALL PROJECT
Final report to GRDC
Full report as Wheat CRC publication
Research papers for Australian journal
Symposium at RACI Cereal Chemistry Conference in Melbourne
INTRODUCTION
- Martin May, NSW Agriculture

FERTILISER ASPECTS
- Tony Good (Incitec) and Matthew Hallam (Pivot)
Overview of the 1998 growing season. Basal and topdressing.
Where was the late N top dressed in 1998?
Where / how much were the crop responses in 1998?

In the West Wyalong and surrounding districts very little top dressing of crops was done by farmers.

From Wellington to Walbundrie late top dressing by plane occurred, covering approx. 70,000 hectares. This urea application in September can add to yield potential as well as increasing protein.

Farmers Issues:
- Farmers’ biggest concerns: Black point (especially in Janz), small seed size and overcoming environmental difficulties with the increased dollars risk.

- Farmers were also concerned with how the grain sampler at the silos determined the extent to which the grain was frosted (small grains) and black point. They were concerned that the receival sampler was not adequately trained to deal with such decisions.

- The farmers thought there should have been more grades relating to frosted samples, rather than having a high-protein sample reduced to feed wheat only because of screenings.

- More thought has to be put into determining receival sites for the PH grade.

- There were significant PH 13 deliveries in southern areas eg. Old Junee, Barellan, Illabo, Merriwagga, Grong Grong, Lake Cargelligo and Brushwood.

Growing-season rainfall was below average in many areas, and a softer finish was predicted, but did not eventuate. Frost had a big effect on yield and grain quality.

The general feeling is that although many farmers lost money trying to achieve Prime Hard last year, they would be prepared to try again this year if premium.

PRESENTATION PAGES FOR TONY GOOD AND MATTHEW HALLAM FOLLOW
• Some "elbowing" by growers before planting.
• Most growers mentally planted an AH1 crop.
• Changed thinking about mid-august with season and price changes.
  – Brochure "rushed-out"
• Heated-up mid-September.
• Full spectrum of results.
  – Confusion created by Snake oil merchants.
• Accidental PH Wheat.
• Western model vs Eastern Model.
• Covered an Area from Wellington to Walbundrie.
• Survey of Ag. pilots indicate about 7,000 t of Urea Topdressed late = 70,000 ha.
• AH1 crops targetted for late topdressing were in the “wet” areas.
  – Temora was a late entry.
  – Lockhart stayed out due to lack of water.
• Economics of Late topdressing often doesn’t include any possible Yields increases.
Need to match this against deliveries-to gauge success/failure.

The 5 letter "F" word.

Biggest concerns in recent farmer chats
- Black tip
- Seed size
- Overcoming environmental difficulties with the increased $ risk
- The idiot on the receivals stand.
Late Topdressing - Where?

- Responses varied & over a wide area:


  - PH13 deliveries significant: Old Junee, Illabo, Barellan, Merriwagga, (Grong Grong, Brushwood, Lake Cargellico).
Late Topdressing - Responses.

- Responses varied & over a wide area.
- Frost: variable effects on yield & quality.
- Growing season rainfall. Softer finish predicted.
- Rates of urea 50-100 kg/ha (most 60-85 kg/ha).
- Timing early booting to after flowering.
- Protein responses 1-1.5%.
- Many lost money but would try again if premium.
- Most growers familiar with requirements.
Nitrogen Monitoring

- Factors to consider when topdressing nitrogen:
  - Available moisture & seasonal outlook.
  - Time of sowing.
  - Plant establishment and tiller numbers.
  - Weed control & disease levels.
  - Conditions & rooting depth.
  - Growth stage.
  - General Nutrition.
Returns

Wheat Returns for 1998 Season

FP / FT ^ AWB Pool

- ASW (Australian Standard White) $127 per tonne
- APW (Australian Premium White) $132 per tonne
- AH 1 (Australian Hard) $145 per tonne
- APH (Australian Prime Hard) $177 per tonne

plus or minus $0.50c for each 0.1% protein above or below 10%

plus $0.50c for each 0.1% protein above 11%

plus $0.50c for each 0.1% protein above 11.5%

plus $0.50c for each 0.1% protein above 13%

Return per Hectare (Specific Yield and Protein Levels of Wheat)

<table>
<thead>
<tr>
<th>Grain</th>
<th>ASW Grade</th>
<th>Protein %</th>
<th>8</th>
<th>8.5</th>
<th>9</th>
<th>9.5</th>
<th>10</th>
<th>10.5</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>11.5</td>
<td>12</td>
<td>12.5</td>
<td>13</td>
<td>13.5</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yield</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.00</td>
<td>234</td>
<td>239</td>
<td>244</td>
<td>249</td>
<td>264</td>
<td>265</td>
<td>274</td>
<td>290</td>
<td>295</td>
</tr>
<tr>
<td>2.50</td>
<td>293</td>
<td>299</td>
<td>305</td>
<td>311</td>
<td>330</td>
<td>336</td>
<td>343</td>
<td>363</td>
<td>369</td>
</tr>
<tr>
<td>3.00</td>
<td>351</td>
<td>359</td>
<td>366</td>
<td>374</td>
<td>396</td>
<td>404</td>
<td>414</td>
<td>435</td>
<td>443</td>
</tr>
<tr>
<td>3.50</td>
<td>410</td>
<td>418</td>
<td>427</td>
<td>436</td>
<td>462</td>
<td>471</td>
<td>480</td>
<td>508</td>
<td>516</td>
</tr>
<tr>
<td>4.00</td>
<td>468</td>
<td>478</td>
<td>488</td>
<td>498</td>
<td>528</td>
<td>538</td>
<td>548</td>
<td>580</td>
<td>590</td>
</tr>
<tr>
<td>4.50</td>
<td>527</td>
<td>538</td>
<td>549</td>
<td>560</td>
<td>594</td>
<td>605</td>
<td>617</td>
<td>652</td>
<td>664</td>
</tr>
<tr>
<td>5.00</td>
<td>585</td>
<td>598</td>
<td>610</td>
<td>623</td>
<td>660</td>
<td>673</td>
<td>685</td>
<td>725</td>
<td>738</td>
</tr>
<tr>
<td>5.50</td>
<td>644</td>
<td>657</td>
<td>671</td>
<td>685</td>
<td>726</td>
<td>740</td>
<td>754</td>
<td>798</td>
<td>811</td>
</tr>
<tr>
<td>6.00</td>
<td>702</td>
<td>717</td>
<td>732</td>
<td>747</td>
<td>792</td>
<td>807</td>
<td>822</td>
<td>870</td>
<td>885</td>
</tr>
</tbody>
</table>

Pivot Limited 01/22/99
Crop Nitrogen Monitoring

- Crop Monitoring Tools
  - Paddock History / Grain Yield and Protein
  - Deep Soil Nitrogen
  - Shoot Densities
  - Sap Nitrate
  - NIR Tissue
  - Test Strips
Deep Soil Nitrogen Service

Pivot Agriculture: Deep N Samples Southern NSW
1996 to 1998

Available N (kgN/ha)

65% < 120 kg N
44% > 120 kg N

35% > 120 kg N

84% < 120 kg N
16% > 120 kg N

Sample Numbers

Avail N 96  Avail N 97  Avail N 98
Enhanced N Trials: 1997
Oaklands & Junee

Response of Wheat to Applied Nitrogen
Oaklands and Junee: 1997

Yield (t/ha) vs Grain Protein %

Treatments Applied:
- Yield (t/ha)
- Protein %

Oaklands

Pivot Limited: Bruce Ramsey 12/03/98
Enhanced N Trials: 1997
Oaklands & Junee

Response of Wheat to Applied Nitrogen
Oaklands and Junee: 1997

Treatments Applied

- Yield (t/ha)
- Profit $
BUYERS and USERS
- The AWB view - Bob Cracknell
- Domestic millers - Report from John Dines (Goodman Fielder, Toowoomba) presented by Colin Wrigley

The 1998 season:
Port Kembla received 20,656 tonnes of grain in the Prime Hard grade from southern sites.

Grain quality:
- Test weight - 80.5 kg/hl
- 1000 kwt - 32.1g/1000 kernels
- Protein - 13.2%
- Falling No - 399 seconds
- Screenings - 2.6%
- Ash - 1.45% (Relatively high, but better than the Northern sites - 1.7%)

Variety make-up, 1998:
- Batavia 32% increased from 10% in 1997
- Janz 41%
- Sunvale 7% this variety has excellent bread making quality
- Sunco 6%
- Cunningham 3% decreased from 22% in 1997

Other “Sun” varieties make up the remaining tonnage, e.g. Sunbrook (poor noodle quality)

As indicated by 1997 data, the blend of these varieties appears to produce a better quality product than can be produced by any one of the varieties on its own.

There is hope for an improvement in noodle quality of the Prime Hard from southern regions from 1997 to 1998, due to the amount of Cunningham being reduced drastically. Cunningham and Sunbrook have poor noodle quality.

There may have been more wheat in southern areas reaching Prime Hard grade, but delivered as AH 1 due to silo availability. It may not of been viable to travel the extra distance to a silo which was accepting the PH grade.

The AWB carefully selects the markets for Australian Prime Hard. Last year most of the grain went to Indonesia, PNG and Malaysia. For the 1998 grain, they are going to target Japan due to the expected rise in noodle quality. This will be a big test for quality!

Finally, the AWB are keen to continue with Prime Hard from southern areas.

PRESENTATION PAGES FOR BOB CRACKNELL AND JOHN DINES FOLLOW
<table>
<thead>
<tr>
<th>Location</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barellan</td>
<td>1843</td>
</tr>
<tr>
<td>Brushwood</td>
<td>264</td>
</tr>
<tr>
<td>Condobolin</td>
<td>1760</td>
</tr>
<tr>
<td>Cunningar</td>
<td>1322</td>
</tr>
<tr>
<td>Euabalong West</td>
<td>2157</td>
</tr>
<tr>
<td>Gobondery</td>
<td>478</td>
</tr>
<tr>
<td>Grong Grong</td>
<td>446</td>
</tr>
<tr>
<td>Gunningbland</td>
<td>183</td>
</tr>
<tr>
<td>Illabo</td>
<td>91</td>
</tr>
<tr>
<td>Kiacatoo</td>
<td>2079</td>
</tr>
<tr>
<td>Kikoira</td>
<td>371</td>
</tr>
<tr>
<td>Lake Cargelligo *</td>
<td>215</td>
</tr>
<tr>
<td>Merriwagga *</td>
<td>1427</td>
</tr>
<tr>
<td>Old Junee</td>
<td>792</td>
</tr>
<tr>
<td>Ootha</td>
<td>203</td>
</tr>
<tr>
<td>Parkes S/T</td>
<td>2729</td>
</tr>
<tr>
<td>Port Kembla</td>
<td>52</td>
</tr>
<tr>
<td>Pucawan</td>
<td>67</td>
</tr>
<tr>
<td>Tottenham</td>
<td>4148</td>
</tr>
<tr>
<td>Trundle</td>
<td>15</td>
</tr>
<tr>
<td>Wirrinya</td>
<td>14</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>20656</strong></td>
</tr>
</tbody>
</table>
### Agrifood Wheat Quality Harvest Sample Comparisons

<table>
<thead>
<tr>
<th>Grade</th>
<th>APH13</th>
<th>APH13</th>
<th>APH13</th>
<th>APH13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample Code</td>
<td>ZPCS</td>
<td>ZFCS</td>
<td>ZFCS</td>
<td>ZFCS</td>
</tr>
<tr>
<td>Season</td>
<td>98/99</td>
<td>97/98</td>
<td>96/97</td>
<td>95/96</td>
</tr>
<tr>
<td>Zone</td>
<td>Port Kembla</td>
<td>Port Kembla</td>
<td>Port Kembla</td>
<td>Port Kembla</td>
</tr>
<tr>
<td>Sample No</td>
<td>84822</td>
<td>79639</td>
<td>70474</td>
<td>61915</td>
</tr>
<tr>
<td>Tonnes</td>
<td>-</td>
<td>65000</td>
<td>82000</td>
<td>120000</td>
</tr>
</tbody>
</table>

### Wheat Results

<table>
<thead>
<tr>
<th>Test Weight (kg/hl)</th>
<th>80.5</th>
<th>81</th>
<th>83.0</th>
<th>82.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moisture %</td>
<td>10.5</td>
<td>10.2</td>
<td>9.5</td>
<td>10.9</td>
</tr>
<tr>
<td>Protein % (11% mb)</td>
<td>13.2</td>
<td>13.6</td>
<td>13.7</td>
<td>14.2</td>
</tr>
<tr>
<td>Ash % (11% mb)</td>
<td>1.45</td>
<td>1.31</td>
<td>1.39</td>
<td>1.35</td>
</tr>
<tr>
<td>Falling No (sec)</td>
<td>399</td>
<td>488</td>
<td>479</td>
<td>397</td>
</tr>
<tr>
<td>Hardness (PSI)</td>
<td>16</td>
<td>16</td>
<td>14</td>
<td>16</td>
</tr>
<tr>
<td>Screenings % (2mm)</td>
<td>2.6</td>
<td>3.9</td>
<td>2.6</td>
<td>2.4</td>
</tr>
<tr>
<td>Foreign Material %</td>
<td>0.26</td>
<td>0.16</td>
<td>0.14</td>
<td>0.08</td>
</tr>
<tr>
<td>1000 Kernel wt (g)</td>
<td>32.1</td>
<td>31.2</td>
<td>38.4</td>
<td>35.7</td>
</tr>
<tr>
<td>US Dockage %</td>
<td>0.38</td>
<td>0.29</td>
<td>0.25</td>
<td>0.15</td>
</tr>
<tr>
<td>US S &amp; B %</td>
<td>0.28</td>
<td>0.64</td>
<td>0.38</td>
<td>0.53</td>
</tr>
<tr>
<td>US F M %</td>
<td>0.04</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Screenings % (1.62mm)</td>
<td>0.3</td>
<td>0.6</td>
<td>0.9</td>
<td>0.9</td>
</tr>
</tbody>
</table>

### Varietal Composition

| Batavia % | 32 | 10 | 12 | 7 |
| Cunningham % | 3 | 22 | 20 | 31 |
| Hartog %   | 3 | 4  | 7  | 7 |
| Janz %     | 41 | 47 | 39 | 31 |
| Miskie %   | - | 1  | 5  | 6 |
| Sunbri %   | 3 | 1  | 3  | 2 |
| Sunco %    | 6 | 5  | 7  | 7 |
| Suneca %   | 3 | 1  | 2  | 2 |
| Sunkota %  | 3 | 1  | 1  | 3 |
| Sunmist %  | - | 2  | 1  | 2 |
| Sunstate % | - | 2  | 2  | 1 |
| Sunvale %  | 7 | -  | -  | - |
BUYER’S COMMENTS
ON QUALITY OF PRIME HARD VARIETIES GROWN
IN SOUTHERN AND WESTERN REGIONS
John Dines,
Defiance – Goodman Fielders (Jan., 1999)

Reports of good dough strength ……

- from 25 years’ experience of buying from Serpentine, west of Bendigo, especially cv. Festiguay, required to provide strength for specific products.

- from 8 years’ experience of buying from southern NSW and Vic.
  - mainly Janz,
  - 11 - 13% protein
  - 20 - 23 cm for extensibility (E45)
  - 300 - 500 BU for resistance (R90)

- from 8 years’ experience of buying from Western Aust., (especially Southern Cross region)
  - Janz, Wilgoyne, Sunco
  - 11 - 14% protein
  - 18 - 24 cm for extensibility (E45)
  - 350 - 500 BU for resistance (R90)

- from the Qld drought year, buying from WA, especially Wilgoyne WAH and ASW
ADVISERS’, CONSULTANTS’ AND RESELLERS’ FORUM
- Owen Boland (Temora), Chris Duff (Young), Geoff Pitson (Cootamundra), James Madden (Lockhart), Paul Lukins (Condobolin), Terry Horan (Temora)
What information did farmers use to base decisions?
What more information is needed for the new PHS regions?
What are the lessons for extending further south?

Major issues:
Late decision re silo receivals
“Accidental PH”
Varieties - information/ suitability for PH, yields vs PH quality and dollars return.

Owen Boland
Problems achieving Prime Hard
1. High levels of nitrogen required.
   - Longer cropping periods eg. 5 years
   - High yield levels eg. 5t/ha and greater require 250 to 300 kg/ha of urea and at least 80 kg/ha in last application.

2. Timing of nitrogen applications
   - Dependant on growth stages and weather

3. Predicting protein levels
   - yield (1% protein change for each 0.5t/ha yield change)
   - N efficiency (40% - 50% for cereals) 2% protein change for each 10% efficiency change.

4. Economics vs risk

5. Varieties
   Very restricted. Approved in the south: Cunningham, Sunbrook, Hybrid Apollo
   Janz is the only main sown variety.

Geoff Pitson
Reached same conclusions as other agronomists
- In-paddock testing should include tiller counts, NIR tissue testing, sap testing.
- In-crop deep-soil testing (DST) and post-sowing testing.
- There is a need to determine the protein level of the grain on-farm rather than waiting until the sample stand to decide where it is to be stored.
**Chris Duff**
3,000 to 4,000 hectares were targeted for PH out of the total 55,000 ha sown.

**Main varieties:**
- Janz 55% (will decrease this year due to black point)
- Dollarbird 25%
- Rosella 10%
- Sunbrook 5%

**Basis of decision to target PH**
- Paddock history
- Nitrogen status, weeds, disease
- Agronomic checklist
- Deep-soil nitrogen tests. When to test and how deep.
- Season confidence
- Economic analysis. ASW vs AH vs PH
- Economic risk. Will the nitrogen application be enough to lift a grade or only cause a shift within a grade?

**Future and Issues:**
- Silo segregation
- Confidence in research and advisory information
- Tissue testing in Sept/Oct, the need for rapid testing procedures
- Side benefits - quality tolerances and gap in grades in a wet harvest
- Dollars
- Lack of varieties
- 1997 and 1998 had difficult finishes
- Nitrogen information
- Starting point for protein - “shift or lift”

---

**PP Luking - District Agronomist - NSW Agriculture**
Some farmer experiences with top-dressed wheat crops, 1998 Condobolin district

- **Des Manwaring, “Wylona” - Cunningham**
  1. 67 ha (one quarter) of 250 ha fallow paddock treated with urea 65 kg DAP, soil test 0-1
    Ocm 18 mg/kg N

  Rate: N 45 kg/ha on 1/9/98 Untreated area 4.0t/hawithprotein 10.8 - 11.8%; treated area 4.3
  t/ha with protein 12.8-13.2% one quarter of paddock went APH ie APW 67 tonnes AH1
  801 tonnes APH 287 tonnes

  2. another fallow paddock of 560 ha treated at 2 different rates:
     - 200 ha had N 32 kg/ha applied 1/9/98 ~ protein result 12.7%
     - 360 ha had N 45 kg/ha applied 1/9/98 ~ protein range 12.9-13.5% overall yield 3.9
       t/ha, no screenings

  3. best crop 48 ha - stubble after lucerne pasture, Hartog 4.9 t/ha, APW grade
• Ted Tomlinson, "Eulandool" - Janz
New paddock with no topdressing went 12% grain protein, compared to 3rd year wheat paddock top dressed with N 30 kg/ha on 2/9/98 also went 12% protein.

Spread N 30 kg/ha over 2400 ha just before significant rains on 2/9/98 and 2717198.
Yield 2.9 t/ha

• Stuart McDonald, "Mumble Creek" - Batavia
N 35 kg/ha gave 0.8 - 1.0 t/ha extra yield and 0.75 % extra protein applied 19/98

550 ha paddock: wheat on wheat stubble 2.2 t/ha
+ topdressing 3.0 t/ha
wheat on canola stubble 3.6 t/ha
+ topdressing 4.8 t/ha
all proteins AH1

• Tony Kelly, "Mogal Plain" - Kamilaroi
5 ha blocks - strip harvested and weighted (Ruddweigh scales)

<table>
<thead>
<tr>
<th>N Kg/ha</th>
<th>yield t/ha</th>
<th>protein%</th>
<th>1000 grain</th>
<th>kg/H1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>weight</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>3.46</td>
<td>13.8</td>
<td>40.8</td>
<td>82.3</td>
</tr>
<tr>
<td>15</td>
<td>3.43</td>
<td>13.7</td>
<td>43.6</td>
<td>82.9</td>
</tr>
<tr>
<td>30</td>
<td>3.6</td>
<td>13.9</td>
<td>43.2</td>
<td>82.6</td>
</tr>
</tbody>
</table>

PRESENTATION PAGES FOR
OWEN BOLAND, CHRIS DUFF, GEOFF PITSON AND PAUL LUKINS FOLLOW
PROBLEMS PRODUCING PRIME HARD

1. HIGH LEVELS OF NITROGEN REQUIRED FOR PH
   - LONGER CROPPING PERIODS
   - HIGH YIELD LEVELS  5 t/ha PLUS
   - REQUIRE 250 TO 300 kg/ha OF UREA
   - THREE APPLICATIONS
   - AT LEAST 80 kg/ha OF UREA IN LAST APPLICATION
     (for possible 1% protein increase)

2. TIMING OF NITROGEN APPLICATIONS
   - GROWTH STAGE
   - WEATHER

3. PREDICTING PROTEIN LEVELS
   - YIELD
     1% protein change for each 0.5 t/ha yield change
   - NITROGEN EFFICIENCY
     2% protein change for each 10% efficiency change
ECONOMICS vs RISK

ASSUMPTION: 80 kg/ha of urea aerial spread to 5 t/ha crop giving a 1% protein increase

COST: $45 per ha

POSSIBLE OUTCOMES

<table>
<thead>
<tr>
<th>RETURN per t</th>
<th>RETURN per ha</th>
<th>PROFIT per ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Stay in same grade</td>
<td>1% protein payment</td>
<td>$5</td>
</tr>
<tr>
<td>b. ASW to APW</td>
<td>9.5 to 10.5</td>
<td>$120.17 to $130.17</td>
</tr>
<tr>
<td>c. APW to AH1</td>
<td>10.5 to 11.5</td>
<td>$130.17 to $140.17</td>
</tr>
<tr>
<td>d. AH1 to PH</td>
<td>12.0 to 13.0</td>
<td>$142.67 to $172.67</td>
</tr>
</tbody>
</table>

5. VARIETIES

VERY RESTRICTED

APPROVED FOR SILO GROUP SOUTH

Cunningham  Sunbrook  Hybrid Appollo
(early sown very limited area)
Janz (only main season prime hard)
# 1998 Nitrogen Use Efficiency

**Grower**: Arrowvale & Co  
**Paddock**: Rods East  

**PDK History**: 1995 PAS  1996 PAS  1997 FAL  

**Variety**: Batavia  
**Sowing Date**: 27/4/98

<table>
<thead>
<tr>
<th>Date</th>
<th>Application</th>
<th>Fertilizer</th>
<th>Rate</th>
<th>N_kg/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>16/3/98</td>
<td>0 TO 60 CM SOIL NITROGEN</td>
<td></td>
<td></td>
<td>94</td>
</tr>
<tr>
<td></td>
<td>MINERALIZATION ESTIMATE</td>
<td></td>
<td></td>
<td>40</td>
</tr>
<tr>
<td>27/4/98</td>
<td>DRILL</td>
<td>DAP</td>
<td>70</td>
<td>14</td>
</tr>
<tr>
<td>25/7/98</td>
<td>TOPDRESS</td>
<td>UREA</td>
<td>60</td>
<td>27</td>
</tr>
<tr>
<td>9/9/98</td>
<td>TOPDRESS</td>
<td>UREA</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

**Total Soil Nitrogen**: 134  
**Total Fertilizer Nitrogen**: 87  
**Total Available Nitrogen**: 221

**Yield**: 4.5 t/ha  
**Avg Protein**: 13.3%  
**Nitrogen Removed in Grain**: 105

**Nitrogen Efficiency**: 48%

# Protein Range 13.0 to 13.6
### 1998 Nitrogen Use Efficiency

**GROWER**  ARROWVALE & CO  **Paddock**  RADFORDS SE

**PDK History**  1995 PAS  1996 FAL  1997 WHT

**Variety**  HARTOG  **Sowing Date**  9/5/98

<table>
<thead>
<tr>
<th>Date</th>
<th>Application</th>
<th>Fertilizer</th>
<th>Rate</th>
<th>N (kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>16/3/98</td>
<td>0 to 60 cm soil nitrogen</td>
<td>MINERALIZATION ESTIMATE</td>
<td>47</td>
<td>40</td>
</tr>
<tr>
<td>9/5/98</td>
<td>Drill</td>
<td>DAP</td>
<td>75</td>
<td>15</td>
</tr>
<tr>
<td>4/8/98</td>
<td>Topdress</td>
<td>UREA</td>
<td>60</td>
<td>27</td>
</tr>
<tr>
<td>10/9/98</td>
<td>Topdress</td>
<td>UREA</td>
<td>80</td>
<td>36</td>
</tr>
</tbody>
</table>

**Total soil nitrogen**  87

**Total fertilizer nitrogen**  78

**Total available nitrogen**  165

**Yield**  4.30 t/ha  
**Avg Protein**  11.5 %  

**Nitrogen removed in grain**  87

**Nitrogen Efficiency**  53 %

# Protein range 10.5 to 12.6
# 1998 NITROGEN USE EFFICIENCY

## Grower
CW MATTISKE & CO

## Paddock
TOBBITS

## PDK History
1995 PAS
1996 PAS
1997 CAN

## Variety
JANZ

## Sowing Date
13/5/98

<table>
<thead>
<tr>
<th>Date</th>
<th>Application</th>
<th>Fertilizer</th>
<th>Rate</th>
<th>N kg/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>24/3/98</td>
<td>0 TO 60 CM SOIL NITROGEN</td>
<td></td>
<td>62</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MINERALIZATION ESTIMATE</td>
<td></td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>7/5/98</td>
<td>DRILL</td>
<td>UREA</td>
<td>110</td>
<td>50</td>
</tr>
<tr>
<td>13/5/98</td>
<td>DRILL</td>
<td>SFOS</td>
<td>120</td>
<td>12</td>
</tr>
<tr>
<td>14/7/98</td>
<td>TOPDRESS</td>
<td>UREA</td>
<td>80</td>
<td>36</td>
</tr>
<tr>
<td>7/9/98</td>
<td>TOPDRESS</td>
<td>UREA</td>
<td>105</td>
<td>48</td>
</tr>
</tbody>
</table>

TOTAL SOIL NITROGEN: 127

TOTAL FERTILIZER NITROGEN: 146

TOTAL AVAILABLE NITROGEN: 273

YIELD 4.90 t/ha  AVG PROTEIN 12.8 %  #

NITROGEN REMOVED IN GRAIN: 110

NITROGEN EFFICIENCY: 40 %

# LITTLE FROST DAMAGE  PROTEIN RANGE 12.2 TO 13.2
1998 NITROGEN USE EFFICIENCY

GROWER      JOHN OBST      Paddock       60 AC
PDK HISTORY  1995 OATS     1996 OATS     1997 CAN
VARIETY      SWIFT         SOWING DATE   8/5/98

<table>
<thead>
<tr>
<th>DATE</th>
<th>APPLICATION</th>
<th>FERTILIZER</th>
<th>RATE</th>
<th>N kg/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>12/3/98</td>
<td>0 TO 60 CM SOIL NITROGEN</td>
<td></td>
<td>62</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MINERALIZATION ESTIMATE</td>
<td></td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>8/5/98</td>
<td>DRILL</td>
<td>UREA</td>
<td>100</td>
<td>46</td>
</tr>
<tr>
<td>8/5/98</td>
<td>DRILL</td>
<td>SFOS</td>
<td>90</td>
<td>9</td>
</tr>
<tr>
<td>19/9/98</td>
<td>TOPDRESS</td>
<td>UREA</td>
<td>80</td>
<td>36</td>
</tr>
</tbody>
</table>

TOTAL SOIL NITROGEN 122
TOTAL FERTILIZER NITROGEN 91
TOTAL AVAILABLE NITROGEN 213

YIELD 6.35 t/ha AVG PROTEIN 12.8 % #
NITROGEN REMOVED IN GRAIN 142
NITROGEN EFFICIENCY 67 %

# NO FROST PROTEIN RANGE 12.2 TO 13.3 ALL AH1
1998 NITROGEN USE EFFICIENCY

GROWER  JOHN OBST  Paddock  DIP

PDK HISTORY  1995 PAS  1996 PAS  1997 CAN

VARIETY  JANZ  Sowing Date

<table>
<thead>
<tr>
<th>DATE</th>
<th>APPLICATION</th>
<th>FERTILIZER</th>
<th>RATE</th>
<th>N kg/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>12/3/98</td>
<td>0 TO 60 CM SOIL NITROGEN</td>
<td></td>
<td></td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>MINERALIZATION ESTIMATE</td>
<td></td>
<td></td>
<td>60</td>
</tr>
<tr>
<td>9/5/98</td>
<td>DRILL</td>
<td>SFOS</td>
<td>90</td>
<td>9</td>
</tr>
<tr>
<td>24/7/98</td>
<td>TOPDRESS</td>
<td>UREA</td>
<td>100</td>
<td>46</td>
</tr>
<tr>
<td>19/9/98</td>
<td>TOPDRESS</td>
<td>UREA</td>
<td>80</td>
<td>36</td>
</tr>
</tbody>
</table>

TOTAL SOIL NITROGEN 136
TOTAL FERTILIZER NITROGEN 91
TOTAL AVAILABLE NITROGEN 227

YIELD 5.00 t/ha  AVG PROTEIN 12.5 % #
NITROGEN REMOVED IN GRAIN 110

NITROGEN EFFICIENCY 48 %

# UP TO 5% FROST DAMAGE  PROTEIN RANGE 12.0 TO 13.3
10 TO 12% BLACK POINT  GP1 TO AH1
1998 NITROGEN USE EFFICIENCY

GROWER: NEIL TURNER  
PADDOCK: 14


VARIETY: DOLLARBIRD  
SOWING DATE: 20/5/98

<table>
<thead>
<tr>
<th>DATE</th>
<th>APPLICATION</th>
<th>FERTILIZER</th>
<th>RATE</th>
<th>N kg/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/3/98</td>
<td>0 TO 60 CM SOIL</td>
<td>NITROGEN</td>
<td></td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>MINERALIZATION</td>
<td>ESTIMATE</td>
<td></td>
<td>70</td>
</tr>
<tr>
<td>20/5/98</td>
<td>BCAST</td>
<td>UREA</td>
<td>60</td>
<td>27</td>
</tr>
<tr>
<td>20/5/98</td>
<td>DRILL</td>
<td>DAP</td>
<td>90</td>
<td>18</td>
</tr>
<tr>
<td>14/8/98</td>
<td>TOPDRESS</td>
<td>UREA</td>
<td>85</td>
<td>39</td>
</tr>
<tr>
<td>25/9/98</td>
<td>TOPDRESS</td>
<td>UREA</td>
<td>80</td>
<td>36</td>
</tr>
</tbody>
</table>

TOTAL SOIL NITROGEN  
TOTAL FERTILIZER NITROGEN  
TOTAL AVAILABLE NITROGEN

YIELD  4.70 t/ha  
AVG PROTEIN  12.0 %  
NITROGEN REMOVED IN GRAIN  99

NITROGEN EFFICIENCY  40 %

# NO FROST DAMAGE  
PROTEIN RANGE 11.5 TO 12.4  
ALL AH1
**1998 NITROGEN USE EFFICIENCY**

**GROWER**  OWEN BOLAND  **PADDOCK**  5

**PDK HISTORY**  1995  PAS  1996  WHT  1997  CAN

**VARIETY**  JANZ  **SOWING DATE**  7/5/98

<table>
<thead>
<tr>
<th>DATE</th>
<th>APPLICATION</th>
<th>FERTILIZER</th>
<th>RATE</th>
<th>N kg/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>12/3/98</td>
<td>0 TO 60 CM SOIL NITROGEN</td>
<td></td>
<td></td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>MINERALIZATION ESTIMATE</td>
<td></td>
<td></td>
<td>70</td>
</tr>
<tr>
<td>3/5/98</td>
<td>BCAST</td>
<td>UREA</td>
<td>70</td>
<td>32</td>
</tr>
<tr>
<td>7/5/98</td>
<td>DRILL</td>
<td>DAP</td>
<td>105</td>
<td>21</td>
</tr>
<tr>
<td>12/8/98</td>
<td>TOPDRESS</td>
<td>UREA</td>
<td>85</td>
<td>39</td>
</tr>
<tr>
<td>4/9/98</td>
<td>TOPDRESS</td>
<td>UREA</td>
<td>55</td>
<td>25</td>
</tr>
</tbody>
</table>

TOTAL SOIL NITROGEN  109
TOTAL FERTILIZER NITROGEN  117
TOTAL AVAILABLE NITROGEN  226

**YIELD**  5.08 t/ha  **AVG PROTEIN**  10.7 %  #

**NITROGEN REMOVED IN GRAIN**  95

**NITROGEN EFFICIENCY**  42 %

# NO FROST  PROTEIN RANGE 10.5 TO 11.5  APW, 1 LOAD AH1
‘98 Prime Hard Review

■ Young/Harden/Greenethorpe:
  Wheat approx. 55,000 ha

■ Main Varieties:
  - Janz 55%
  - Dollarbird 25%
  - Rosella 10%
  - Sunbrook 5%
  - Other 5%

■ 3-4,000 ha treated for protein increase. Both AH & PH
‘98 Prime Hard Review

- The Future & Issues:
  - Prime Hard sites
  - Confidence on Research & Advisory Info
  - Tissue testing in Sept./Oct.
- Side Benefits:
  - Quality tolerances
  - Gap in grades in wet harvest
'98 Prime Hard Review

- **Trial Result:**
  - High N site (100 kg/ha applied N).
  - Application at flowering of 35 kg/ha N
  - Lifted yield by 0.3 t/ha
  - Lifted protein by 0.5%

(However, shift within PH grade)
'98 Prime Hard Review

- Basis of decision:
  - Farm history (protein)
  - Agronomic checklist
  - DSN
  - Season - confidence
  - Associated Risk
  - Economic Analysis
    - ASW- AH - PH
  - Economic Risk
‘98 Prime Hard Review

■ *Results:*

■ Targeted paddocks treated
■ Rate: 35-45 kg/ha N
■ Shift 0.5 - 1.0%
■ Indications some yield gain
■ Grower summary: happy with end result, but quality problems left concerns.
■ Durum growers results.
‘98 Prime Hard Review

- The Future & Issues
- Dollars
- Lack of Prime Hard varieties
- “97 & ‘98 years, difficult finish: bigger the crop harder they fell.
- Nitrogen information, practical levels for protein shifts.
- Starting point for protein shifting within grades v’s up grades
PRIME WHEAT NOTES

Paddock History
- Nitrogen Status, Disease, Weeds

Deep Soil Test

Timing of Tests

Depth - 60 - 100 cm – Past. Fallow / After Break Crop

Soil Test - Result Presentation

- Time from Testing to Results
- Reliability

Number - Per Paddock / Per Hectare

Organic Carbon

- Mineralizing
- Range of Readings

Variety

Performance at High Nitrogen Levels

Yield vs Protein Achiever

Tillering / Bulk; Drymatter
- Janz/Vulcan
- Sunvalle
- Sunbrook

Disease – YLS, Septoria, Stripe Rust
- Root, Crown, Stem Rots / Complex

Grain Quality
- Screenings
- Sprouted Grain
- Blacktip
PRIME WHEAT NOTES – CONT.

GEOFF PITSON AGRONOMIC CONSULTANCY

IN PADDOCK TESTING
- TILLER COUNTS
- NIR TISSUE TESTING
  - HOW EARLY
  - HOW LATE
- SAP TESTING

IN CROP - DEEP SOIL TESTING
- INCROP - POST SOW

RAINFALL / STORED MOISTURE
- SEASONAL WEATHER SOIL MODEL
- RAINFALL PREDICTING MODELS
- CROP – FINE LINE OF HAYING OFF VS FINISHING
- RELIABILITY OF RAINFALL AREAS / DISTRICTS
- MEASURING / MONITORING SOIL MOISTURE

SILO DELIVERY
- VARIETY – PURITY – MIXES
- DISTANCE TO FREIGHT GRAIN
- TESTING STANDARDS

MARKETING
- PRICE DIFFERENTIAL VS AH
- TIMING OF PRICE VS NITROGEN APPLICATION
- CONTRACT – FIXED / MULTI GRADE TONNAGE
- GROWER ATTITUDE TO RISK TAKING
Some Farmer Experiences with topdressed wheat crops

Des Manwaring, “Wylona” - Cunningham

1. 67 ha (one quarter) of 250 ha fallow paddock treated with urca
   65 kg DAP, soil test 0-10cm 18 mg/kg N
   Rate: N 45 kg/ha on 1/9/98
   Untreated area 4.0 t/ha with protein 10.8 - 11.8%;
   treated area 4.3 t/ha with protein 12.8-13.2%
   one quarter of paddock went APH le
   APW 67 tonnes
   AHI 801 tonnes
   APH 287 tonnes

2. another fallow paddock of 560 ha treated at 2 different rates:
   • 200 ha had N 32 kg/ha applied 1/9/98 → protein result 12.7%
   • 360 ha had N 45 kg/ha applied 1/9/98 → protein range 12.9-13.5%
   overall yield 3.9 t/ha, no screenings

3. best crop 48 ha - stubble after lucerne pasture, Hartog 4.9 t/ha, APW grade

Ted Tomlinson, “Eulandool” - Janz

* new paddock with no topdressing went 12% grain protein, compared to 3rd year wheat paddock
   topdressed with N 30 kg/ha on 2/9/98 also went 12% protein.
* spread N 30 kg/ha over 2400 ha just before significant rains on 2/9/98 and 27/7/98.
   Yield 2.9 t/ha

Stuart McDonald, “Mumble Creek” - Batavia

N 35 kg/ha gave 0.8 - 1.0 t/ha extra yield and 0.75 % extra protein applied 1/9/98

550 ha paddock: wheat on wheat stubble 2.2 t/ha
               + topdressing 3.0 t/ha
               wheat on canola stubble 3.6 t/ha
               + topdressing 4.8 t/ha

all proteins AHI

Tony Kelly, “Mogal Plain” - Kamilaroi

5 ha blocks - strip harvested and weighted (Ruddweigh scales)

<table>
<thead>
<tr>
<th>N Kg/ha</th>
<th>yield t/ha</th>
<th>protein%</th>
<th>1000 grain weight</th>
<th>kg/Hl</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3.46</td>
<td>13.8</td>
<td>40.8</td>
<td>82.3</td>
</tr>
<tr>
<td>15</td>
<td>3.43</td>
<td>13.7</td>
<td>43.6</td>
<td>82.9</td>
</tr>
<tr>
<td>30</td>
<td>3.6</td>
<td>13.9</td>
<td>43.2</td>
<td>82.6</td>
</tr>
</tbody>
</table>

P P Lukins
District Agronomist
27 January, 1999
FARMERS' FORUM
- Alwyn Collins (Walla Walla), John Coghlan (Cudal), John Derick (Temora)
Comments from growers from diverse regions who aimed to produce PH in 1998
Reasons for decisions. Success / failure.

All three growers had a positive approach to growing Prime Hard wheat even though the late frost had very detrimental effects on grain quality.

- John Coghlan had all the conditions right for a high-yield high-protein crop before the frost. His main comment is that seasonal conditions may make it impossible to achieve Prime Hard in some seasons. However he now knows how to produce Prime Hard protein and will continue trying.

- Alwyn Collins commented that he could only achieve Prime Hard by using his best paddock, he has achieved high-protein AH 1 in the past and is sure he will make Prime Hard in the future.

- John Derick managed to get some grain into Prime Hard, but most was downgraded due to frost. In future, he would like to be able to take his truck to a receival, have it tested and maybe go to another site without having the load retested. Retesting causes delays in deliveries.

PRESENTATION PAGES FOR JOHN COGHLAN AND ALWYN COLLINS FOLLOW
## Harvest Summary 1998

### Wheat

<table>
<thead>
<tr>
<th>Variety</th>
<th>SH</th>
<th>TH</th>
<th>Total</th>
<th>Sold</th>
<th>Stored</th>
<th>Storage</th>
<th>Protein</th>
<th>AVYield</th>
</tr>
</thead>
<tbody>
<tr>
<td>A08</td>
<td>JANZ</td>
<td>48</td>
<td>5.069</td>
<td>243.30</td>
<td></td>
<td></td>
<td></td>
<td>12.66</td>
</tr>
<tr>
<td>A13</td>
<td>JANZ</td>
<td>36</td>
<td>4.884</td>
<td>175.840</td>
<td>25.00</td>
<td>A14</td>
<td></td>
<td>12.81</td>
</tr>
<tr>
<td>B12</td>
<td>JANZ</td>
<td>32</td>
<td>5.981</td>
<td>191.390</td>
<td>30.00</td>
<td>A1 (frost)</td>
<td></td>
<td>11.62</td>
</tr>
<tr>
<td>B13</td>
<td>JANZ</td>
<td>30</td>
<td>5.852</td>
<td>178.560</td>
<td>88.560</td>
<td>90.00</td>
<td></td>
<td>13.60</td>
</tr>
<tr>
<td>B21</td>
<td>JANZ</td>
<td>23</td>
<td>6.679</td>
<td>187.010</td>
<td></td>
<td></td>
<td></td>
<td>10.81</td>
</tr>
<tr>
<td>B25</td>
<td>JANZ</td>
<td>30</td>
<td>4.591</td>
<td>137.740</td>
<td></td>
<td></td>
<td></td>
<td>11.79</td>
</tr>
<tr>
<td>E05</td>
<td>JANZ</td>
<td>22</td>
<td>5.892</td>
<td>129.620</td>
<td></td>
<td></td>
<td></td>
<td>12.52</td>
</tr>
<tr>
<td>E07</td>
<td>JANZ</td>
<td>60</td>
<td>5.259</td>
<td>315.520</td>
<td></td>
<td></td>
<td></td>
<td>12.65</td>
</tr>
<tr>
<td>SUNBROOK</td>
<td></td>
<td></td>
<td></td>
<td>20.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E01</td>
<td>SUNBROOK</td>
<td>20</td>
<td>4.803</td>
<td>137.000</td>
<td>137.00A6; A13; A7; A8; A12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RJ1</td>
<td>JANZ</td>
<td>35</td>
<td>6.006</td>
<td>212.400</td>
<td>55.74</td>
<td>B3 (seed)</td>
<td></td>
<td>12.39</td>
</tr>
<tr>
<td>RJ3</td>
<td>JANZ</td>
<td>38</td>
<td>5.339</td>
<td>202.900</td>
<td></td>
<td></td>
<td></td>
<td>12.47</td>
</tr>
<tr>
<td>RJ4</td>
<td>JANZ</td>
<td>71</td>
<td>4.899</td>
<td>347.830</td>
<td></td>
<td></td>
<td></td>
<td>12.07</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td></td>
<td>532</td>
<td></td>
<td></td>
<td>215.1930</td>
<td>161.340</td>
<td>365.740</td>
<td></td>
</tr>
</tbody>
</table>

### Barley

<table>
<thead>
<tr>
<th>Variety</th>
<th>SH</th>
<th>TH</th>
<th>Total</th>
<th>Stored</th>
<th>Seed</th>
<th>Storage</th>
<th>Protein</th>
<th>AVYield</th>
</tr>
</thead>
<tbody>
<tr>
<td>B06</td>
<td>TANTANGARA</td>
<td>13</td>
<td>6.10</td>
<td>79.320</td>
<td>16.470</td>
<td>B10</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>62.850</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td></td>
<td>13</td>
<td>79.320</td>
<td>62.850</td>
<td>16.470</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Triticale

<table>
<thead>
<tr>
<th>Variety</th>
<th>SH</th>
<th>TH</th>
<th>Total</th>
<th>Stored</th>
<th>Seed</th>
<th>Storage</th>
<th>Protein</th>
<th>AVYield</th>
</tr>
</thead>
<tbody>
<tr>
<td>R22</td>
<td>TAHARA</td>
<td>30</td>
<td>4.47</td>
<td>134.220</td>
<td>13.070</td>
<td>B5</td>
<td></td>
<td>121.150</td>
</tr>
<tr>
<td>G23</td>
<td>TAHARA</td>
<td>30</td>
<td>2.79</td>
<td>83.610</td>
<td>83.610</td>
<td>B1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G26</td>
<td>TAHARA</td>
<td>20</td>
<td>3.91</td>
<td>78.200</td>
<td>78.200</td>
<td>B1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R5</td>
<td>MAIDEN</td>
<td>18</td>
<td>3.00</td>
<td>54.000</td>
<td>12.000</td>
<td>E5</td>
<td></td>
<td>42.000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(seed)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E02</td>
<td>MAIDEN</td>
<td>8</td>
<td>2.28</td>
<td>18.260</td>
<td>18.260</td>
<td>B1</td>
<td></td>
<td>42.000</td>
</tr>
<tr>
<td>D09</td>
<td>TAHARA</td>
<td>22</td>
<td>4.77</td>
<td>104.970</td>
<td>104.970</td>
<td>B1</td>
<td></td>
<td>104.970</td>
</tr>
<tr>
<td>B01</td>
<td>TAHARA</td>
<td>4</td>
<td>3.91</td>
<td>15.630</td>
<td>1.630</td>
<td>B1</td>
<td></td>
<td>15.630</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(seed)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B02</td>
<td>TAHARA</td>
<td>5</td>
<td>2.76</td>
<td>13.800</td>
<td>13.800</td>
<td>B1</td>
<td></td>
<td>13.800</td>
</tr>
<tr>
<td>A07</td>
<td>TAHARA</td>
<td>48</td>
<td>4.71</td>
<td>226.090</td>
<td>84.890</td>
<td>B1</td>
<td></td>
<td>84.890</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(frost)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A21</td>
<td>MAIDEN</td>
<td>9</td>
<td>2.78</td>
<td>25.000</td>
<td>25.000</td>
<td>A4</td>
<td></td>
<td>25.000</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td></td>
<td>194</td>
<td>763.840</td>
<td>763.840</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parcel No.</td>
<td>Variety</td>
<td>Ha</td>
<td>Yield</td>
<td>Oil Content</td>
<td>Av. Yld</td>
<td>Oil Yield</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------</td>
<td>---------</td>
<td>----</td>
<td>-------</td>
<td>-------------</td>
<td>---------</td>
<td>----------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A01</td>
<td>OSCAR</td>
<td>50</td>
<td>2.621</td>
<td>131.060</td>
<td>45.44</td>
<td>2.262</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A02</td>
<td>OSCAR</td>
<td>22</td>
<td>2.325</td>
<td>51.160</td>
<td>43.77</td>
<td>2.325</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A03</td>
<td>OSCAR</td>
<td>44</td>
<td>2.649</td>
<td>116.440</td>
<td>43.25</td>
<td>2.649</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A04</td>
<td>GROUSE</td>
<td>44</td>
<td>2.190</td>
<td>98.620</td>
<td>43.28</td>
<td>2.190</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A05</td>
<td>GROUSE</td>
<td>24</td>
<td>2.481</td>
<td>59.060</td>
<td>46.69</td>
<td>2.481</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A06</td>
<td>GROUSE</td>
<td>15</td>
<td>1.867</td>
<td>28.000</td>
<td>42.09</td>
<td>1.867</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A09</td>
<td>GROUSE</td>
<td>10</td>
<td>2.282</td>
<td>22.820</td>
<td>42.00</td>
<td>2.282</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A10</td>
<td>OSCAR</td>
<td>29</td>
<td>2.184</td>
<td>63.340</td>
<td>42.60</td>
<td>2.184</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A11</td>
<td>GROUSE</td>
<td>50</td>
<td>2.237</td>
<td>111.860</td>
<td>45.14</td>
<td>2.237</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A12</td>
<td>OSCAR</td>
<td>42</td>
<td>2.314</td>
<td>97.190</td>
<td>42.77</td>
<td>2.314</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A14</td>
<td>GROUSE</td>
<td>64</td>
<td>2.409</td>
<td>154.170</td>
<td>43.34</td>
<td>2.409</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A15</td>
<td>GROUSE</td>
<td>18</td>
<td>2.288</td>
<td>41.190</td>
<td>44.16</td>
<td>2.288</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A23</td>
<td>OSCAR</td>
<td>12</td>
<td>1.710</td>
<td>20.520</td>
<td>43.91</td>
<td>1.710</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B03</td>
<td>RAINBOW</td>
<td>14</td>
<td>2.591</td>
<td>36.280</td>
<td>42.00</td>
<td>2.591</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B04</td>
<td>RAINBOW</td>
<td>4</td>
<td>2.750</td>
<td>11.000</td>
<td>42.00</td>
<td>2.750</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B05</td>
<td>RAINBOW</td>
<td>8</td>
<td>3.033</td>
<td>24.250</td>
<td>41.20</td>
<td>3.033</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B07</td>
<td>RAINBOW</td>
<td>25</td>
<td>3.189</td>
<td>79.720</td>
<td>43.20</td>
<td>3.189</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B10</td>
<td>RAINBOW</td>
<td>39</td>
<td>2.784</td>
<td>108.580</td>
<td>41.10</td>
<td>2.784</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B14</td>
<td>RAINBOW</td>
<td>34</td>
<td>3.118</td>
<td>106.000</td>
<td>43.97</td>
<td>3.118</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B15</td>
<td>RAINBOW</td>
<td>34</td>
<td>3.081</td>
<td>104.760</td>
<td>42.26</td>
<td>3.081</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B16</td>
<td>RAINGROUSE</td>
<td>32</td>
<td>3.105</td>
<td>99.360</td>
<td>43.68</td>
<td>3.105</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B18</td>
<td>RAINBOW</td>
<td>30</td>
<td>3.450</td>
<td>103.490</td>
<td>41.89</td>
<td>3.450</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B19</td>
<td>RAINBOW</td>
<td>33</td>
<td>3.153</td>
<td>104.040</td>
<td>43.32</td>
<td>3.153</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E03</td>
<td>OSCAR</td>
<td>13</td>
<td>2.668</td>
<td>34.680</td>
<td>43.80</td>
<td>2.668</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E04</td>
<td>GROUSE</td>
<td>6</td>
<td>2.750</td>
<td>22.000</td>
<td>42.80</td>
<td>2.750</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E06</td>
<td>OSCAR</td>
<td>36</td>
<td>2.206</td>
<td>101.030</td>
<td>43.85</td>
<td>2.206</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TOTALS:** 1978.630 20.000 100.000 100.000 1978.630 20.000

---

All A BLOCKS > NEW FARM - COMACTION - FROST

B3, A > FROST

E3, 9 > FROST

E10

E6 > FROST, SCLEROTINIA.
- Paddock History.
- 1/5- Deep N Soil Test - 80 kg/ha
- No preplant N.
- 10/5- Sunbri @ 70 kg/ha & 100 kg/ha Starterfos.
- 19/6- 171 plants/m²- 520 shoots/m².
- Grass & Broadleaf weed control.
- 13/8- 992 plants/m²- 4.5% N.
- 9/9- 737 plants/m² - 2.1% N.
- 23/9 - 120 kg/ha Urea before 24 mm rain.
- 3 t/ha @ 13.5% Feed Wheat. Frost damage - moisture not limiting.
Paddock History:

1/5 Deep N Soil Test - 100 kg/ha
No preplant N.

10/5- Sunbri @ 70 kg/ha & 100 kg/ha Starterfos.

19/6 - 215 plants/m², 520 shoots/m².
Grass & Broadleaf weed control:
13/8 - 1227 plants/m², 4.7 %N.
9/9 - 851 plants/m², 2.6 %N.

23/9 - 120 kg/ha Urea before 24 mm rain.
2 t/ha @ 14.7 % Feed Wheat Frost damage - moisture not limiting.
- Paddock History. Spray Fallow Pasture.
- 1/2- Deep N Soil Test - 70 kg/ha
- 24/4- Wide row band 125 kg/ha Urea (60N).
- 17/5- Roundup + Logran.
- 20/5- $bird @ 65 kg/ha & 105 kg/ha Starterfos.
- mid july- 140 plants/m² 550 shoots/m². Wanted 550max.
- Grass & Broadleaf weed control.
- 17/9 - 55 kg/ha Urea (25N) before 24 mm rain.
- 4 t/ha @ 13.8 % AH13.
- Economics.
- Crop water-use, plant density and WUE.
CONCLUSIONS SESSION
Chairman Bob Cracknell
Lessons for grain buyers
Lessons for advisers
Lessons for farmers
Lessons for NSW Agriculture
Extension activities needed for 1999 season.

- **The CSIRO Decision Support System for N management** - John Angus presented a computer-program model, designed to predict if conditions are favourable and if it is possible to achieve PH protein with high yields.

- **Quality results from the PH in South trials** - Helen Allen presented the 1997 harvest quality results. The 1997 harvest year proved that it is possible to achieve a higher percentage of 13+ protein in southern Australian than northern Australia, in a given year. The overall quality results for three years' testing did not clearly show any trends or any real differences between southern and northern Australia. An overview of the results suggest that a blend of varieties in the Prime-Hard pool is much better than any single variety. It is better to have a number of varieties that all meet the Prime-Hard standards than a large percentage of any single variety.

- **Results expected for the wider range of wheats** - Reports from John Skerritt (CSIRO Plant Industry, Canberra) presented by Colin Wrigley

**Buyers perspective:**
Potential in regions to produce high quality wheat. ASW is now considered to be the base of grain quality, with most farmers targeting higher grades.

- Timing of allocations of receival sites
- Flexible receival arrangements
- On-farm storage to optimise results (blending)
- Pre-delivery testing
- Multigrade contracts
- Promoting varieties

**Advisers:**
- Grower selection
- Paddock selection and targeting
- Targeting varieties for stage of rotation
- PH targeting, opportunistic growers
- Sowing rates
- Tissue testing post DC30; recalculate to DC30
- Soil test turn-around time
- Variety-support package
  - High nitrogen levels
  - Seeding rates (plant populations, row spacings)
  - Sowing time

PRESENTATION PAGES FOR HELEN ALLEN AND JOHN SKERRITT FOLLOW
Protein range achieved at 1997 harvest sites

% protein

Northern sites

Southern sites

Coonamble
Cyrton
Gilgandra
Moree
Arish Park
Young
Cowra
Balranald
Walpeup
Varley
Merredin
Goodlands
Marewa
Salmon Gums
Mullewa
GRDC / CRC projects on “Flexibility of wheat use”
supervised by John Skerritt (CSIRO Plant Industry)

Project 3. Genetic and biochemical basis of varietal interchangeability

Project Aims. Enhance an understanding of the potential of Prime Hard wheats to be produced in southern environments by determining genetic and biochemical explanations of environmental variation in dough properties:

1. Establish a biochemical basis for differences in dough properties between samples of the same genotype and protein content in defined environments;
2. Determine whether consistent differences in dough / quality properties are found between northern and southern environments using cross-breds in Prime Hard backgrounds and doubled haploid lines, differing in HMW- and LMW-GS.

Conclusions (Progress Report, 1/99)

- For the 1997 season, protein quality of doubled haploid “Prime Hard” type-lines grown in southern sites was as good as those grown in “traditional environments” (northern control sites). The milling quality of the southern-grown samples was poorer, due to grain pinching arising from a dry seasonal finish in the south.

- certain glutenin subunit alleles (HMW-GS 7+8, 5+10, LMW-GS bbc) were consistently associated with high sedimentation volumes (and higher physical dough strength) at each site.

- greater dough strength and extensibilities in Prime Hard (13 % protein and 15 % protein) lines from particular sites were associated with a higher proportion of large glutenin polymers.
GRDC / CRC projects on “Flexibility of wheat use”
supervised by John Skerritt (CSIRO Plant Industry)

Project 4. Managing within-paddock variation in wheat quality

Project Aims
1. Establish methods for enabling growers who will use precision agricultural practices (most specifically variable N fertiliser within paddocks) to increase the certainty with which they could produce grain of a given quality.
2. To quantify the relationship between paddock-scale variations in grain yield and quality characteristics, and pre-harvest indicators of soil status and crop development.
3. To contribute towards research on the development of a simple on-farm test for protein content in wheat.

Conclusions (Progress Report, 1/99)
- The paddocks studied for the 1996 and 1997 harvests differed significantly in fertility, management inputs and grain yield and protein profiles.
- Within-paddock variation in protein content and protein quality was often very significant and as large as between-paddock variation for the same wheat type/ cropping environment.
- Within-paddock variation in quality was often greater than within-paddock variation in protein content.
- Areas of higher yield usually did not produce grain of lower protein content or protein quality. Thus within-paddock trends do not follow trends of “classical” agronomic nitrogen trials.
- In 1997, soil characteristics (pH, organic carbon, nitrate) had a more significant effect on grain protein content and quality characteristics than did variation in fertiliser application or seed rates. For several paddocks, low pH appeared to be the limiting factor to both yield and protein content.
- Thus using site-specific management (precision agricultural) methods to increase yield did not damage protein content or quality.
- Field experiments aimed to determine whether results of the previous season’s site-specific monitoring could be used to increase the uniformity of grain quality in a subsequent season.
"PH in SOUTH" IMPLEMENTATION GROUP

Extension booklet for 1999.
Reporting on the overall project
Final report to GRDC
Full report as Wheat CRC publication
Research papers for Australian journal
Symposium at RACI Cereal Chemistry Conference in Melbourne

Extension booklet for 1999

Additional requirements of Bill Rathmell have been incorporated. Those present agreed to get the completed brochure out by sowing, i.e. April 1999. The document will be circulated via private and NSW Agriculture’s Extension officers.

Topics to be covered:
- Economics - John Brennan
- Risks - John Brennan
- Agronomy - John Angus, Tony Good and Neil Fettell
- How to set up a group - Tony Fay
- The role of Graincorp - Bob Cracknell (link this into section above)
- Quality, variety - Helen Allen
- Marketing - Bob Cracknell

Text is to be supplied to Helen Allen by Monday 15th Feb. Helen will collate the sections and circulate to the group for review, including copies to Clare Johnson, Paul Parker, Paul Lukins and Geoff Pitson to ensure that it is written in easy-to-understand language. All members will review text and return to Helen Allen by Thursday, 25th Feb. Helen will arrange for design by Wagga staff.

The final design will need to incorporate all relevant logos, and QWCRC will need to approve it formally before printing. Therefore, a colour proof should be express-posted to the CRC to allow any necessary changes to be requested before printing.

Printing will be arranged by Wagga staff:
- Any cost saving should be notified to QWCRC, and money saved may be redirected toward the Frosted Wheat work.
- 10,000 copies should be made, and a few provided to QWCRC.
- The remainder should be distributed via private and Agriculture Department extension officers.