



Department of  
Agriculture and Food



Research Library

---

Experimental Summaries - Plant Research

---

1970

# Summaries of experimental results - 1970 growing season Long term rotation experiments

I C. ROWLAND

Follow this and additional works at: <https://researchlibrary.agric.wa.gov.au/rqmsplant>

---

## Recommended Citation

ROWLAND, I C. (1970), *Summaries of experimental results - 1970 growing season Long term rotation experiments*. Department of Agriculture and Food, Western Australia, Perth. Article.

This article is brought to you for free and open access by Research Library. It has been accepted for inclusion in Experimental Summaries - Plant Research by an authorized administrator of Research Library. For more information, please contact [jennifer.heathcote@agric.wa.gov.au](mailto:jennifer.heathcote@agric.wa.gov.au), [sandra.papenfus@agric.wa.gov.au](mailto:sandra.papenfus@agric.wa.gov.au).

## **IMPORTANT DISCLAIMER**

This document has been obtained from DAFWA's research library website ([researchlibrary.agric.wa.gov.au](http://researchlibrary.agric.wa.gov.au)) which hosts DAFWA's archival research publications. Although reasonable care was taken to make the information in the document accurate at the time it was first published, DAFWA does not make any representations or warranties about its accuracy, reliability, currency, completeness or suitability for any particular purpose. It may be out of date, inaccurate or misleading or conflict with current laws, policies or practices. DAFWA has not reviewed or revised the information before making the document available from its research library website. Before using the information, you should carefully evaluate its accuracy, currency, completeness and relevance for your purposes. We recommend you also search for more recent information on DAFWA's research library website, DAFWA's main website (<https://www.agric.wa.gov.au>) and other appropriate websites and sources.

Information in, or referred to in, documents on DAFWA's research library website is not tailored to the circumstances of individual farms, people or businesses, and does not constitute legal, business, scientific, agricultural or farm management advice. We recommend before making any significant decisions, you obtain advice from appropriate professionals who have taken into account your individual circumstances and objectives.

The Chief Executive Officer of the Department of Agriculture and Food and the State of Western Australia and their employees and agents (collectively and individually referred to below as DAFWA) accept no liability whatsoever, by reason of negligence or otherwise, arising from any use or release of information in, or referred to in, this document, or any error, inaccuracy or omission in the information.

---

PLANT RESEARCH DIVISION

SUMMARIES OF EXPERIMENTAL RESULTS,  
1970 GROWING SEASON

I.C. ROWLAND

"LONG TERM ROTATION EXPERIMENTS"

For a brief summary of objectives, site history and treatments, see the 1969 summary of results.

W56H: Pdk 3E on Wongan Hills Research Station.

Wheat yield 1970 in bushels/acre:

|              |   | 1st  | 2nd  | 3rd  | 4th  | Crop |
|--------------|---|------|------|------|------|------|
| Years clover | 2 | 33.1 | 31.2 | 28.4 | 28.4 |      |
|              | 3 | 34.3 | 30.1 | 30.6 | 35.2 |      |
|              | 5 | 35.3 | 30.6 | 33.3 | 32.3 |      |
|              | 7 | 34.6 | 34.6 | 32.1 | 28.0 |      |

Rainfall during the May - October growing season:

| May | June | July | August | Sept. | October | Total         |
|-----|------|------|--------|-------|---------|---------------|
| 86  | 344  | 114  | 60     | 114   | 41      | 759<br>points |

Total soil nitrogen, in lbs N/ac 3", from plots before the 1970 crop was sown (i.e. from the 1969 treatments) are:-

|              | 0 | 1st | 2nd | 3rd | 4th | Crop |
|--------------|---|-----|-----|-----|-----|------|
| Years clover | 1 | 327 | -   | -   | -   | -    |
|              | 2 | 386 | 383 | 337 | 355 | 340  |
|              | 3 | 435 | 363 | 367 | 340 | 340  |
|              | 4 | 435 | -   | -   | -   | -    |
|              | 5 | 557 | 413 | 423 | 470 | 390  |
|              | 6 | 520 | -   | -   | -   | -    |
|              | 7 | 690 | 540 | 453 | 400 | 450  |

This includes any coarse organic matter in the surface 3".

Samples taken at the end of the 1969 season were analysed in more detail on the less than 2 mm. fraction. Some of the results are :

...../2.

Carbon in lbs c/acre 3"

|                | 0    | 1st  | 2nd  | 3rd  | 4th  | Crop |
|----------------|------|------|------|------|------|------|
| Years clover 1 | 5367 | -    | -    | -    | -    |      |
| 2              | 5840 | 5050 | 5133 | 4900 | 5000 |      |
| 3              | 5800 | 5225 | 5233 | 5250 | 4900 |      |
| 4              | 5300 | -    | -    | -    | -    |      |
| 5              | 6425 | 5075 | 5667 | 5750 | 5200 |      |
| 6              | 5850 | -    | -    | -    | -    |      |
| 7              | 7033 | 5900 | 6067 | 5950 | 5400 |      |

Calcium in lbs Ca/acre 3"

|                | 0   | 1st | 2nd | 3rd | 4th | Crop |
|----------------|-----|-----|-----|-----|-----|------|
| Years clover 1 | 226 | -   | -   | -   | -   |      |
| 2              | 240 | 250 | 260 | 230 | 240 |      |
| 3              | 256 | 266 | 240 | 250 | 240 |      |
| 4              | 270 | -   | -   | -   | -   |      |
| 5              | 286 | 280 | 254 | 290 | 280 |      |
| 6              | 300 | -   | -   | -   | -   |      |
| 7              | 320 | 306 | 314 | 280 | 280 |      |

Potassium in lbs K/acre 3"

|                | 0   | 1st | 2nd | 3rd | 4th | Crop |
|----------------|-----|-----|-----|-----|-----|------|
| Years clover 1 | 68  | -   | -   | -   | -   |      |
| 2              | 116 | 84  | 84  | 92  | 112 |      |
| 3              | 104 | 72  | 72  | 88  | 100 |      |
| 4              | 112 | -   | -   | -   | -   |      |
| 5              | 124 | 72  | 80  | 100 | 80  |      |
| 6              | 132 | -   | -   | -   | -   |      |
| 7              | 132 | 60  | 60  | 80  | 80  |      |

...../3.

66M29: Pdk 5AE on Merredin Research Station  
Wheat yields 1970 in bus/ac.

| Stage of Rotation 1970     | Yield | N   | C    |
|----------------------------|-------|-----|------|
| 5th Crop                   | 14.3  | 92  | 965  |
| 1st crop after 1 yr. medic | 14.8  | 93  | 1059 |
| 1st crop after 2 yr. medic | 13.9  | 101 | 1100 |
| 1st crop after 3 yr. medic | 14.2  | 91  | 983  |
| 1st crop after 5 yr. medic | 15.9  | 99  | 1065 |
| 2nd crop after 2 yr. medic | 13.9  | 92  | 975  |
| 2nd crop after 4 yr. medic | 14.5  | 98  | 1070 |
| 2nd crop after 3 yr. medic | 14.5  |     |      |

Stage of rotation altered to allow for 1 year medic before commencement.

Nitrogen and carbon are as 1000 X % in the less than 2 mm fraction and represent the amount estimated to be present before the corresponding 1970 crop.

Rainfall during May - October growing season:-

| May | June | July | August | Sept. | Oct. | Total      |
|-----|------|------|--------|-------|------|------------|
| 110 | 255  | 91   | 72     | 317   | 56   | 901 Points |

67BA6 : Pdk 7 on Badgingarra Research Station.  
Wheat yields in 1970 bus/ac.

| Stage of Rotation 1970     | Yield |
|----------------------------|-------|
| 1st crop from virgin scrub | 20.7  |
| 4th successive crop        | 17.7  |

Rainfall during May - October growing season:

| May | June | July | August | Sept. | Oct. | Total        |
|-----|------|------|--------|-------|------|--------------|
| 243 | 733  | 332  | 232    | 239   | 115  | 1892 Points. |

...../4.

67N 4: Experimental Pdk on Newdegate Research Station

Wheat yields in 1970 bus/ac.

| Stage of Rotation 1970       | Yield | N. | C.  |
|------------------------------|-------|----|-----|
| 4th successive crop          | 19.5  | 38 | 486 |
| 1st crop after 1 yr.pasture  | 22.2  | 43 | 573 |
| 1st crop after 2 yr.pasture  | 25.3  | 41 | 556 |
| 1st crop after 8 yr.pasture  | 23.5  | 55 | 665 |
| 2nd crop after 7 yr. pasture | 20.0  | 45 | 545 |
| 3rd crop after 6 yr. pasture | 20.6  | 53 | 640 |

Stage of rotation altered to allow for 5 years previous pasture.

Nitrogen and carbon are as 1000 X % in the less than 2 mm fraction and represent the amount estimated to be present before the corresponding 1970 crop.

Rainfall during May - October growing season:-

| May | June | July | August | Sept. | Oct. | Total      |
|-----|------|------|--------|-------|------|------------|
| 117 | 197  | 90   | 54     | 215   | 70   | 743 Points |

67C13: Pdk 19B, Chapman Research Station.

Wheat yields in 1970 bus/ac.

| Stage of Rotation 1970        | Yield | N  | C   |
|-------------------------------|-------|----|-----|
| 4th successive crop           | 48.9  | 58 | 605 |
| 1st crop after 1 year pasture | 56.1  | 59 | 631 |
| 1st crop after 2 " "          | 53.9  | 60 | 628 |
| 1st crop " 6 " "              | 50.6  | 72 | 760 |
| 2nd " " 5 " "                 | 58.3  | 81 | 790 |
| 3rd " " 4 " "                 | 59.7  | 69 | 755 |

Stage of rotation altered to allow for 3 years previous pasture.

Nitrogen and carbon are as 1000X% in the less than 2 mm fraction and represent the amount estimated to be present before the corresponding 1970 crop.

Rainfall during the May - October growing season:-

| May | June | July | August | Sept. | October | Total       |
|-----|------|------|--------|-------|---------|-------------|
| 168 | 484  | 195  | 138    | 311   | 85      | 1381 Points |

68E5 : Pdk N1A, Esperance Downs Research Station.

Wheat and Linseed yields in 1970 bus/ac.

| Stage of Rotation, 1970                   | Yield |
|---|-------|
| 3rd successive wheat                      | 27.8  |
| 1st wheat after 1 year pasture            | 31.5  |
| 1st wheat after 7 year pasture            | 34.2  |
| 1st wheat after 1 linseed after 6 pasture | 36.1  |
| 3rd successive linseed                    | 8.5   |
| 1st linseed after 1 year pasture          | 11.3  |
| 1st linseed after 7 year pasture          | 11.5  |

Heavy weed infestations in the linseed plots.

Stage of rotation altered to allow for 5 years pasture prior to commencement

Rainfall for May - October growing season : -

| May | June | July | August | September | October | Total       |
|-----|------|------|--------|-----------|---------|-------------|
| 169 | 147  | 74   | 268    | 393       | 48      | 1099 Points |

68SG5 : Pdk. H5, Salmon Gums Research Station.

Wheat yields in 1970 bus/ac.

| Stage of rotation in 1970          | Yield |
|------------------------------------|-------|
| 7th successive crop + 45 lbs. urea | 14.9  |
| 7th successive crop nil urea       | 13.6  |
| 1st crop after 1 year medic        | 16.4  |
| 1st crop after 2 year medic        | 17.3  |
| 2nd crop after 1 year medic        | 13.7  |
| 1st crop after 1 year volunteer    | 15.2  |
| 1st crop after 2 year "            | 16.8  |
| 2nd " " 1 " "                      | 14.5  |

Stage of rotation altered to allow for 4 years cropping prior to commencement

Rainfall during May - October growing season

| May | June | July | August | Sept. | Oct. | Total |
|-----|------|------|--------|-------|------|-------|
| 123 | 114  | 34   | 69     | 281   | 61   | 682   |

Crops were badly frost damaged.

69GE 20 : H.R. Bridgeman's property, Horrocks.

Wheat yields bus /ac.

| Stage of rotation 1970            | Yield | Cereal Eelworm    |
|-----------------------------------|-------|-------------------|
| 2nd successive crop + 75 lbs.urea | 26.0  | } medium to heavy |
| 2nd " " +150 " "                  | 29.3  |                   |
| 1st crop after 1 year fallow      | 24.4  | Light to medium   |
| 1st crop after 1 year pasture     | 20.1  | " " "             |

Presence of grasses in the pasture plots and the difficulty encountered in keeping the fallow plots clean during 1969 may have contributed to the infestation in these plots.



"EFFECT OF UREA SPRAYS ON GRAIN QUALITY"

Background:

There has been much overseas work done to investigate the possibility of spraying nitrogen onto wheat plants near flowering, to increase the grain protein content. In the U.S.A. grain protein was increased from 10.8% to 13.3% and 15.2% by application of 65 and 108 lbs urea/acre respectively. (Finney, et.al., 1957). Wheat grain protein was increased from 11.4% to 15.5% New Delhi (Sadaphol & Das 1966).

Local results have shown increases of grain protein from 11.2 to 13.4% in 1954 (Leeves). Trials in 1968 showed increases from 9.5 to 11.0%.

Aim :

To run a preliminary experiment on spraying urea solutions on flowering wheat plants.

Method:

Two sites were selected, one on the Wongan Hills Research Station and the other on the Badgingarra Research Station. The first site was 2nd year Dwalginup pasture on Elphin loamy sand, the other was a site cropped in 1969 on gravelly sand.

Each site was ploughed and sown to wheat with superphosphate and urea in 10.5 link by 2 chain plots. At flowering the concentrations and rates shown were sprayed on. Plots were harvested and a sample taken for analysis.

The crop on 70WH19 was very uniform, however, that on 70BA15 was severely affected by wind blasting, take-all and septoria.

Results:

70WH 19

|         |            |                 |
|---------|------------|-----------------|
| Gamenya | 45 lbs/ac  | sown 12/6/70    |
| Super   | 120 lbs/ac | sprayed 29/9/70 |
| Urea    | 75 lbs/ac  |                 |

Averages of 4 reps:

| Treatment             | Yield bus/ac. | 1000 grain weights | Protein % |
|-----------------------|---------------|--------------------|-----------|
| 0% urea 0 galls water | 29.7          | 37.6gms            | 12.4      |
| 0% " 30 " "           | 28.8          | 37.0               | 12.4      |
| 0% " 100 " "          | 28.4          | 37.3               | 12.7      |
| 10% " 25lbs urea/ac   | 29.6          | 37.0               | 12.4      |
| 10% " 50 " "          | 28.2          | 35.7               | 13.3      |
| 10% " 100 " "         | 28.4          | 36.0               | 13.0      |
| 25% " 25 " "          | 28.5          | 36.8               | 12.9      |
| 25% " 50 " "          | 27.2          | 35.7               | 12.9      |
| 25% " 100 " "         | 29.3          | 36.3               | 13.2      |
| 44% " 25 " "          | 27.9          | 36.4               | 12.8      |
| 44% " 50 " "          | 29.0          | 36.4               | 13.15     |
| 44% " 100 " "         | 28.2          | 36.0               | 13.4      |
| 25% " 25 " "          | 27.1          | 36.1               | 12.8      |
| 25% " 50 " "          | 28.0          | 36.4               | 12.9      |
| 25% " 100 " "         | 28.8          | 36.0               | 13.1      |

...../2.

Differences between concentration and rates for yield and 1000 grain weights are not significant.

For protein percentages the differences between rates are significant ( $p < .05$ )

L.S.D. between Rate means :  $p < .05 = 0.423$

|      |      |                    |
|------|------|--------------------|
| 25   | 50   | 100 lbs.urea/acre. |
| 12.6 | 13.1 | 13.2               |

70 BA 15

Kondukt 45 lbs/ac                      sown 5/6/70  
 super 180 lbs/ac                      sprayed 8/10/70  
 urea 80 lbs/ac

Averages of 3 reps:

| Treatments              | Yield bus/ac. | 1000 grain weights | Protein % |
|-------------------------|---------------|--------------------|-----------|
| 0% urea 0 gallons water | 16.2          | 25.2               | 12.0      |
| 0 " 30 " "              | 17.7          | 24.2               | 12.0      |
| 0 " 100 " "             | 17.6          | 24.7               | 11.4      |
| 10% urea 25 lbs.urea/ac | 16.7          | 24.3               | 12.3      |
| 10 " 50 " "             | 19.6          | 24.6               | 11.6      |
| 10 " 100 " "            | 19.1          | 24.9               | 12.6      |
| 25 " 25 " "             | 19.2          | 24.6               | 11.9      |
| 25 " 50 " "             | 13.0          | 24.2               | 11.9      |
| 25 " 100 " "            | 17.2          | 22.3               | 13.3      |
| 44 " 25 " "             | 18.9          | 23.9               | 12.2      |
| 44 " 50 " "             | 18.2          | 25.8               | 11.8      |
| 44 " 100 " "            | 17.5          | 24.3               | 13.0      |

Differences between concentration and rates for yield and 1000 grain weight are not significant.

For protein percentages the differences between rates are significant ( $p < .05$ )

L.S.D. between Rate means:  $p < .05 = 0.376$

$< .001 = 0.687$

|      |      |                   |
|------|------|-------------------|
| 25   | 50   | 100 lbs urea/acre |
| 12.1 | 11.7 | 12.9              |

\*\*\*\*\*