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Allison, F.E. (1955) Does nitrogen applied to crop residues produce more humus?. *Soil Science Society of America Journal.* 19, 210-211.


REFERENCES


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Konboon, Y. (Unpublished Data-a) Decomposition and nutrient release from leaves and stem of two legumes as studied by perfusion technique.

Konboon, Y. (Unpublished Data-b) Decomposition and nutrient release from cut and uncut residue as studied by perfusion technique.


REFERENCES


REFERENCES


REFERENCES


REFERENCES


REFERENCES


REFERENCES


Technicon (1977) Nitrate and Nitrite in Soil Extracts. Industrial Method No. 487-77A


REFERENCES


REFERENCES


Appendix 4.1: Result of analysis of variance performed by NEVA computer program

FILE APPA2.OUT  CREATED BY NEVA VERSION 6.0
ON 9/3 / 1988 AT 12:34PM
# 1 NEVA APPARENT RECOVERY OF 2ND CROP (% & T/HA)
# 2 FACTORS R3 SS A2

** 3 FACTORS: **
30 ITEMS
# 3 EFFECTS R S A SA RSA/
# 4 C P
# 5 DATA
# 6 -21.73 -45.55 20.16
# 7 508.64 512.65 488.88
# 8 166.30 102.21 122.56
# 9 60.11 87.39 186.13
# 10 326.81 209.49 443.51
# 11 11.32 10.59 21.66
# 12 93.30 35.63 86.92
# 13 4.53 41.43 42.96
# 14 39.63 95.65 84.16
# 15 119.40 50.48 156.37
# 16 END

<table>
<thead>
<tr>
<th>SOURCE</th>
<th>DF</th>
<th>SUM OF SQUARES</th>
<th>MEAN SQUARE</th>
</tr>
</thead>
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<td>519217.300000</td>
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<td>16808.470000</td>
<td>8404.233000</td>
</tr>
<tr>
<td>S</td>
<td>4</td>
<td>324279.500000</td>
<td>81069.870000</td>
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<td>196572.500000</td>
<td>196572.500000</td>
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<td>189821.500000</td>
<td>47455.370000</td>
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<tr>
<td>RSA/</td>
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<td>31667.800000</td>
<td>1759.322000</td>
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<td>DF</td>
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<td>MEAN SQUARE</td>
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<td>519217.300000</td>
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<td>4</td>
<td>324279.500000</td>
<td>81069.870000</td>
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<td>196572.500000</td>
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<tr>
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<td>4</td>
<td>189821.500000</td>
<td>47455.370000</td>
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<tr>
<td>RSA/</td>
<td>1</td>
<td>31667.800000</td>
<td>1759.322000</td>
</tr>
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</table>

SD OF MEANS BASED ON PLOT ERROR 41.44270 DF: 18

GRAND MEAN MEANS OF 10. SD= 13.24270 5PC LSD= 22.7711 1PC LSD=
151.1758

R MEANS OF 10. SD= 13.24270 5PC LSD= 39.4407 1PC LSD=
53.9972

R 1 R 2 R 3
132.7710 101.9790 159.9210

2
5PC DUNCANS MULTIPLE RANGE
39.4993 41.1447

S MEANS OF 10. SD= 17.3947 5PC LSD= 50.9474 1PC LSD=
69.7161

G 1 G 2 G 3 G 4 G 5
-4.1323 248.0198 158.9117 218.0100

SORTED MEANS
-4.1323 79.9983 89.9117 218.0100 248.0063

2
5PC DUNCANS MULTIPLE RANGE
50.8771 53.3822 54.9999 56.0650

A MEANS OF 10. SD= 15.8400 5PC LSD= 32.2032 1PC LSD=
44.0985

A 1 A 2 A 3 A 4 A 5
21.5804 13.8000 9.5856

CA MEANS OF 10. SD= 15.8400 5PC LSD= 32.2032 1PC LSD=
96.5956
Appendix 5.1: Nutrient solution of residue plants per one application

<table>
<thead>
<tr>
<th>Compounds</th>
<th>M.W. (g)</th>
<th>Nutrient</th>
<th>Compound (g/L)</th>
<th>Nutrient (kg/ha)</th>
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<tbody>
<tr>
<td>Macronutrients</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ca(NO₃)₂.4H₂O</td>
<td>236.1</td>
<td>N</td>
<td>7.083</td>
<td>9.692</td>
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<tr>
<td></td>
<td></td>
<td>Ca</td>
<td></td>
<td>13.881</td>
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<tr>
<td>KNO₃</td>
<td>101.1</td>
<td>K</td>
<td>2.022</td>
<td>9.023</td>
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<tr>
<td></td>
<td></td>
<td>N</td>
<td></td>
<td>3.231</td>
</tr>
<tr>
<td>NH₄H₂PO₄</td>
<td>115.0</td>
<td>P</td>
<td>2.3</td>
<td>7.154</td>
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<tr>
<td></td>
<td></td>
<td>N</td>
<td></td>
<td>2.231</td>
</tr>
<tr>
<td>MgSO₄.7H₂O</td>
<td>246.4</td>
<td>Mg</td>
<td>1.848</td>
<td>2.103</td>
</tr>
<tr>
<td></td>
<td></td>
<td>S</td>
<td></td>
<td>2.778</td>
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<tr>
<td>KCl</td>
<td>74.5</td>
<td>K</td>
<td>1.49</td>
<td>9.023</td>
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<tr>
<td>Micronutrients</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>FeNaEDTA</td>
<td>367.1</td>
<td>Fe</td>
<td>0.55065</td>
<td>0.966</td>
</tr>
<tr>
<td>MnCl₂.4H₂O</td>
<td>197.9</td>
<td>Mn</td>
<td>0.2969</td>
<td>0.095</td>
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<tr>
<td>ZnCl₂</td>
<td>136.2</td>
<td>Zn</td>
<td>0.00204</td>
<td>0.011</td>
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<tr>
<td>CuCl₂</td>
<td>134.4</td>
<td>Cu</td>
<td>0.00134</td>
<td>0.0073</td>
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<tr>
<td>H₃BO₃</td>
<td>61.8</td>
<td>B</td>
<td>0.00031</td>
<td>0.00063</td>
</tr>
<tr>
<td>(NH₄)₆Mo₇O₂₄.4H₂O</td>
<td>1235.3</td>
<td>Mo</td>
<td>0.00012</td>
<td>0.00011</td>
</tr>
</tbody>
</table>
Appendix 5.2: Result of analysis of variance and mean comparisons performed by IRRISTAT computer program

FILENAME : 15N-PT
TITLE : 15N IN JAPANESE MILLET

**Analysis of Variance**

**Split Plot Design**

**Replication (R) = 3**

**Mainplot Factor: Harvest (H) = 3**
- H1 = 27D
- H2 = 48D
- H3 = 91D

**Subplot Factor: 2 x 3**

**Fertiliser (F) = 2**
- F1 = LOW
- F2 = HIGH

**Residue (M) = 3**
- M1 = FLEMINGIA
- M2 = MEDIC
- M3 = WHEAT

### 15N in Millet (% of Added)

<table>
<thead>
<tr>
<th></th>
<th>REP1</th>
<th>REP2</th>
<th>REP3</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F1</td>
<td>1.456</td>
<td>0.187</td>
<td>0.215</td>
</tr>
<tr>
<td>M1</td>
<td>4.243</td>
<td>2.331</td>
<td>1.049</td>
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<tr>
<td>M2</td>
<td>6.056</td>
<td>0.638</td>
<td>3.575</td>
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<tr>
<td>M3</td>
<td>10.474</td>
<td>4.247</td>
<td></td>
</tr>
<tr>
<td>F2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M1</td>
<td>1.877</td>
<td>5.105</td>
<td>1.520</td>
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<tr>
<td>M2</td>
<td>1.889</td>
<td>1.686</td>
<td>0.672</td>
</tr>
<tr>
<td>M3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F1</td>
<td>2.106</td>
<td>3.091</td>
<td>3.779</td>
</tr>
<tr>
<td>M1</td>
<td>17.594</td>
<td>11.396</td>
<td>12.501</td>
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<tr>
<td>M2</td>
<td>7.650</td>
<td>4.142</td>
<td>4.356</td>
</tr>
<tr>
<td>M3</td>
<td>3.143</td>
<td>3.141</td>
<td>3.851</td>
</tr>
<tr>
<td>F2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M1</td>
<td>9.359</td>
<td>9.018</td>
<td>8.081</td>
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<tr>
<td>M2</td>
<td>4.896</td>
<td>4.143</td>
<td>4.021</td>
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<tr>
<td>M3</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>H3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F1</td>
<td>2.727</td>
<td>3.509</td>
<td>5.233</td>
</tr>
<tr>
<td>M1</td>
<td>24.238</td>
<td>15.092</td>
<td>14.039</td>
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<tr>
<td>M2</td>
<td>5.223</td>
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<td>5.912</td>
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<tr>
<td>M3</td>
<td>5.149</td>
<td>5.120</td>
<td>5.326</td>
</tr>
<tr>
<td>F2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M1</td>
<td>12.152</td>
<td>15.508</td>
<td>16.053</td>
</tr>
<tr>
<td>M2</td>
<td>7.013</td>
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<td>16.935</td>
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<tr>
<td>M3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Rep Totals**: 107.52, 104.839, 105.456

**Rep Means**: 5.374, 5.629, 5.859
### ANÁLISIS DE VARIANZA PARA 15N EN MILLET (% DE AÑADIDO)

<table>
<thead>
<tr>
<th>SV</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>REP (R)</td>
<td>2</td>
<td>0.210724</td>
<td>0.105362</td>
<td>-</td>
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<tr>
<td>HARVEST (H)</td>
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<td>723.183698</td>
<td>361.591849</td>
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<tr>
<td>ERROR (a)</td>
<td>4</td>
<td>17.325127</td>
<td>4.331282</td>
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<tr>
<td>FERTILISER (F)</td>
<td>1</td>
<td>0.102095</td>
<td>0.102095</td>
<td>&lt;1</td>
</tr>
<tr>
<td>RESIDUE (M)</td>
<td>2</td>
<td>444.356526</td>
<td>222.178263</td>
<td>63.21 **</td>
</tr>
<tr>
<td>FXM</td>
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<td>29.425485</td>
<td>14.712742</td>
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<td>HxF</td>
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<td>26.746967</td>
<td>13.373483</td>
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<tr>
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<td>167.774812</td>
<td>41.94703</td>
<td>11.93 **</td>
</tr>
<tr>
<td>HxFxM</td>
<td>4</td>
<td>25.789807</td>
<td>6.447452</td>
<td>1.83 ns</td>
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<tr>
<td>ERROR (b)</td>
<td>30</td>
<td>105.452761</td>
<td>3.515092</td>
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<tr>
<td>TOTAL</td>
<td>53</td>
<td>1540.368002</td>
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</table>

\[ \text{cv(b) = 31.8\%} \]

** = significant at 1% level; * = significant at 5% level
ns = not significant; - = insufficient error df

### HxFxM TABLA DE MEANOS PARA 15N EN MILLET (% DE AÑADIDO)

#### (AVE. OVER 3 REPS)

<table>
<thead>
<tr>
<th>FERTILISER (F)</th>
<th>RESIDUE (M)</th>
<th>LOW</th>
<th>HIGH</th>
<th>M-MEAN</th>
<th>DIFF</th>
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</thead>
<tbody>
<tr>
<td>H=27D</td>
<td>FLEMINGIA</td>
<td>0.306 a</td>
<td>0.625 a</td>
<td>0.465 a</td>
<td>-0.164 ns</td>
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<tr>
<td></td>
<td>MEDIC</td>
<td>1.462 a</td>
<td>2.167 a</td>
<td>1.815 a</td>
<td>-0.705 ns</td>
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<td>WHEAT</td>
<td>0.822 a</td>
<td>1.416 a</td>
<td>1.119 a</td>
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<tr>
<td>H=48D</td>
<td>FLEMINGIA</td>
<td>2.992 b</td>
<td>3.378 b</td>
<td>3.185 b</td>
<td>-0.380 ns</td>
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<tr>
<td></td>
<td>MEDIC</td>
<td>12.830 a</td>
<td>9.015 a</td>
<td>11.425 a</td>
<td>4.811 **</td>
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<td>5.383 b</td>
<td>4.353 b</td>
<td>4.868 b</td>
<td>1.029 ns</td>
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<tr>
<td>H=91D</td>
<td>FLEMINGIA</td>
<td>3.823 c</td>
<td>5.265 b</td>
<td>4.544 c</td>
<td>-1.442 ns</td>
</tr>
<tr>
<td></td>
<td>MEDIC</td>
<td>16.653 a</td>
<td>14.904 a</td>
<td>15.779 a</td>
<td>1.749 ns</td>
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<tr>
<td></td>
<td>WHEAT</td>
<td>7.321 b</td>
<td>12.247 a</td>
<td>9.784 a</td>
<td>-4.926 **</td>
</tr>
</tbody>
</table>

\[ \text{F-MEAN} = 3.844 \quad 3.931 \quad 5.887 \quad 0.687 \]

** = significant at 1% level; ns = not significant

In a column under each H, means followed by a common letter are not significantly different at the 5% level by DMRT.

<table>
<thead>
<tr>
<th>Comparison</th>
<th>S.E.D.</th>
<th>LSD(5%)</th>
<th>LSD(1%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-F means at each H*M</td>
<td>1.531</td>
<td>3.126</td>
<td>4.210</td>
</tr>
<tr>
<td>2-M means at each H*F</td>
<td>1.591</td>
<td>3.126</td>
<td>4.210</td>
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</table>
### HxM TABLE OF MEANS FOR 15N IN MILLET (% OF ADDED)
(AVE. OVER 2 F AND 3 REPS)

<table>
<thead>
<tr>
<th>Harvest (H)</th>
<th>27D</th>
<th>48D</th>
<th>91D</th>
<th>M-Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FLEMINGIA</strong></td>
<td>0.466 a</td>
<td>3.185 b</td>
<td>4.544 c</td>
<td>2.732</td>
</tr>
<tr>
<td><strong>MEDIC</strong></td>
<td>1.815 a</td>
<td>11.425 a</td>
<td>15.779 a</td>
<td>9.673</td>
</tr>
<tr>
<td><strong>WHEAT</strong></td>
<td>1.119 a</td>
<td>4.868 b</td>
<td>9.784 b</td>
<td>5.257</td>
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<tr>
<td><strong>M-Mean</strong></td>
<td>1.133</td>
<td>6.493</td>
<td>10.036</td>
<td>5.887</td>
</tr>
</tbody>
</table>

In a column, means followed by a common letter are not significantly different at the 5% level by DMRT.

### Comparison

<table>
<thead>
<tr>
<th>S.E.D.</th>
<th>LSD(5%)</th>
<th>LSD(1%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-M means at each H</td>
<td>1.082</td>
<td>2.211</td>
</tr>
<tr>
<td>2.977</td>
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</tbody>
</table>

### HxF TABLE OF MEANS FOR 15N IN MILLET (% OF ADDED)
(AVE. OVER 3 M AND 3 REPS)

<table>
<thead>
<tr>
<th>Fertiliser (F)</th>
<th>Harvest (H)</th>
<th>Low</th>
<th>High</th>
<th>M-Mean</th>
<th>Diff</th>
</tr>
</thead>
<tbody>
<tr>
<td>27D</td>
<td>0.843</td>
<td>1.403</td>
<td>1.133</td>
<td>-0.539 ns</td>
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</tr>
<tr>
<td>48D</td>
<td>2.462</td>
<td>5.564</td>
<td>6.493</td>
<td>1.818 *</td>
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</tr>
<tr>
<td>91D</td>
<td>9.266</td>
<td>10.805</td>
<td>10.036</td>
<td>-1.540 ns</td>
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</tr>
<tr>
<td><strong>F-Mean</strong></td>
<td>5.644</td>
<td>5.931</td>
<td>5.887</td>
<td>-0.087</td>
<td></td>
</tr>
</tbody>
</table>

* = significant at 5% level, ns = not significant

### Comparison

<table>
<thead>
<tr>
<th>S.E.D.</th>
<th>LSD(5%)</th>
<th>LSD(1%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-F means at each H</td>
<td>0.884</td>
<td>1.805</td>
</tr>
<tr>
<td>2.431</td>
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</tbody>
</table>

### FxM TABLE OF MEANS FOR 15N IN MILLET (% OF ADDED)
(AVE. OVER 3 H AND 3 REPS)

<table>
<thead>
<tr>
<th>Fertiliser (F)</th>
<th>Residue (M)</th>
<th>Low</th>
<th>High</th>
<th>M-Mean</th>
<th>Diff</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FLEMINGIA</strong></td>
<td>2.374 c</td>
<td>3.085 c</td>
<td>4.732</td>
<td>-0.716 ns</td>
<td></td>
</tr>
<tr>
<td><strong>MEDIC</strong></td>
<td>10.649 a</td>
<td>8.697 a</td>
<td>9.673</td>
<td>1.952 *</td>
<td></td>
</tr>
<tr>
<td><strong>WHEAT</strong></td>
<td>4.508 a</td>
<td>4.257 b</td>
<td>5.257</td>
<td>-1.497 ns</td>
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<tr>
<td><strong>F-Mean</strong></td>
<td>5.844</td>
<td>5.931</td>
<td>5.887</td>
<td>-0.087</td>
<td></td>
</tr>
</tbody>
</table>

* = significant at 5% level, ns = not significant

In a column, means followed by a common letter are not significantly different at the 5% level by DMRT.

### Comparison

<table>
<thead>
<tr>
<th>S.E.D.</th>
<th>LSD(5%)</th>
<th>LSD(1%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-M means at each M</td>
<td>1.884</td>
<td>1.805</td>
</tr>
<tr>
<td>2.431</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*** END OF ANALYSIS OF VARIANCE RUN ***