**Yield reduction with defoliation of young leaves in castor: (2009-10)**

Yield reduction from defoliation of young leaves in castor (48-1) was studied during *kharif* 2009-10 by imposing defoliation @ 0, 25, and 50% from top at spike initiation stage on primary, secondary and tertiary branches separately and in combinations. Experimental design was randomized block with three replications and five rows per replication. Defoliation was done from top and 25 or 50% of the leaves of that order, on each branch were removed at a particular stage. Removed leaf number and area were quantified (Table: 10). Data on growth, dry matter, yield components and yield of different order branches was recorded.

Table 10: Actual percent defoliation imposed

|  |  |  |
| --- | --- | --- |
| **% defoliation** | **Removed leaf area (%)** | **Average % defoliation** |
| 25% on primary | 9-23 | 16 |
| 50% on primary | 23-31 | 27 |
| 25% on secondary | 38-44 | 41 |
| 50% on secondary | 48-73 | 61 |
| 25% on tertiary | 38-47 | 43 |
| 50% on tertiary | 47-59 | 53 |

Table 11: Seed yield of different spike orders

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **S.No.** | **Treatment** | **Primary** | **Secondary** | **Tertiary** | **Quarternary** | **Pentenary** | **Total Seed**  **yield (g/plant)** |
| 1 | 25%P | 22.2 | 19.1 | 70.7 | 39.5 | 34.5 | 185.9 |
| 2 | 50%P | 21.3 | 23.0 | 66.2 | 30.9 | 35.1 | 176.5 |
| 3 | 25%P+S | 22.9 | 16.2 | 64.3 | 38.5 | 35.5 | 177.4 |
| 4 | 50%P+S | 20.3 | 15.1 | 59.7 | 34.0 | 46.8 | 176.0 |
| 5 | 25%P+T | 23.5 | 21.5 | 43.2 | 32.5 | 40.6 | 161.4 |
| 6 | 50%P+T | 18.8 | 22.8 | 34.2 | 34.7 | 36.8 | 147.3 |
| 7 | 25%P+S+T | 24.7 | 19.9 | 45.2 | 31.1 | 36.5 | 157.3 |
| 8 | 50%P+S+T | 21.8 | 17.5 | 37.0 | 33.9 | 34.5 | 144.7 |
| 9 | 25%S | 29.2 | 19.7 | 60.6 | 31.7 | 47.2 | 188.4 |
| 10 | 50%S | 32.3 | 17.6 | 64.5 | 33.8 | 37.3 | 185.5 |
| 11 | 25%S+T | 26.8 | 17.4 | 41.7 | 33.9 | 45.3 | 165.1 |
| 12 | 50%S+T | 23.9 | 20.7 | 34.7 | 33.9 | 45.5 | 158.8 |
| 13 | 25%T | 24.8 | 24.0 | 46.5 | 31.7 | 39.9 | 166.9 |
| 14 | 50%T | 23.7 | 24.2 | 34.1 | 29.9 | 39.3 | 151.2 |
| 15 | control | 27.8 | 19.6 | 86.3 | 28.9 | 41.0 | 203.6 |
|  | Mean | 24.3 | 19.9 | 52.6 | 33.3 | 39.7 | **169.7** |
|  | SEm± | 2.02 | 2.03 | 4.2 | 2.5 | 3.31 | 6.35 |
|  | CD(0.05) | 5.85 | NS | 12.1 | NS | NS | 18.42 |
|  | CV(%) | 14.6 | 17.5 | 13.7 | 13.2 | 14.4 | 6.49 |

Primary seed yield reduced with 50% defoliation from top on primary either alone or in combination with other defoliation stages (Table: 11). Even with 25% defoliation the reduction was significant when defoliated on all order branches. Treatmental differences for secondary seed yield were not significant with defoliation as the growth of secondaries was affected due to stress followed by continuous, heavy rains from 40 to 85 days after sowing. Tertiary seed yield decreased significantly with defoliation on any order. In general, higher order branches compensate when defoliation was done on lower order branches, but as secondary growth and yield was affected due to erratic rain fall during that stage, even with defoliation on primary, tertiary seed yield was affected. With increase in % defoliation at any stage, there was significant reduction in tertiary seed yield. Plants tried to compensate by producing quarternaries and pentenaries.

Total seed yield reduced with defoliation, but the reduction was not significant for 25% defoliation on primary (actual defoliation was 12% only) and 25, 50% defoliation only on secondaries. Overall, the seed yield reduction was 13% in primary, 42% in tertiary, and 18% in total (Table: 12).

Table 12: TDM, Total seed yield and % reduction in seed yield with different defoliation treatments

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sl.No. | Treatment | TDM (g/pl.) | Total Seed  yield (g/plant) | % reduction in seed yield |
| 1 | 25%P | 483 | 185.9 | 9 |
| 2 | 50%P | 446 | 176.5 | 13 |
| 3 | 25%P+S | 490 | 177.4 | 13 |
| 4 | 50%P+S | 468 | 176.0 | 14 |
| 5 | 25%P+T | 429 | 161.4 | 21 |
| 6 | 50%P+T | 386 | 147.3 | 28 |
| 7 | 25%P+S+T | 382 | 157.3 | 23 |
| 8 | 50%P+S+T | 363 | 144.7 | 29 |
| 9 | 25%S | 484 | 188.4 | 8 |
| 10 | 50%S | 483 | 185.5 | 9 |
| 11 | 25%S+T | 442 | 165.1 | 19 |
| 12 | 50%S+T | 457 | 158.8 | 22 |
| 13 | 25%T | 427 | 166.9 | 18 |
| 14 | 50%T | 369 | 151.2 | 26 |
| 15 | control | 538 | 203.6 |  |
|  | **Mean** | **443** | **169.7** | **18** |
|  | SEm± | 14.3 | 6.35 |  |
|  | CD(0.05) | 41.3 | 18.42 |  |
|  | CV(%) | 5.6 | 6.49 |  |

Thus, leaf removal from top at any stage and even with 25% showed significant reduction in total seed yield. Loss in the early stages can be compensated to some extent with growth in higher order branches. Yield reduction was more with defoliation on all order branches