# RESEARCH

Twenty one projects were entertained by SAURES in the year 2008-2009. The result of the ongoing research projects and completed research projects are presented as summary form in this report.

## ONGOING RESEARCH PROJECTS

### DEVELOPMENT OF SHORT DURATION DROUGHT AND/OR SALINITY TOLERANT GENOTYPES IN *Brassica rapa* THROUGH INTERSPECIES HYBRIDIZATION WITH *B. juncea* FOR IMPROVED YIELD AND OIL CONTENT

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#### Extended Summary

*B. rapa* varieties occupy the major oil seed growing areas of Bangladesh. However, the intolerance of these varieties to drought and / or salinity are one of the major obstacles to expand the varieties into the problem soils. *B. juncea* varieties are low yielding and require long time to mature but they are more tolerant to drought and / or salinity. Thus an interspecific crossing programme was initiated with the view to develop new combination of *B. rapa* genome (AA) to have new materials that would be short duration with higher yield potential and higher drought and / or saline tolerance.

The interspecific crossing was done in winter 2007 using each of the 5 varieties of *B. rapa* along with 3 varieties of *B. juncea*. The 5 varieties of *B. rapa* used in crossing programme were – SAU Sarisha 1, BARI Sarisha 6, SS 75, BARI Sarisha 15 and Tori 7. The varieties of *B. juncea* were - Rai 5, BARI Sarisha 10 and BARI Sarisha 11. The seeds of all the interspecies hybrids were grown in 2008. The leaves of the hybrid plants were of intermediate type with their inflorescence resembled more to *juncea* that to *rapa*. The mean data obtained in different important yield and yield contributing traits are presented in Table 1.

Most of the hybrids showed heterosis for number of secondary branches per plant and number of siliquea per plant. As the plants were of triploid (2n = 3x = 20 AA + 8 B) in nature, most of the male gametes were infertile which were evident by the lower number of seed per siliqua. Most of the siliquae were empty. The siliquae were smaller in size with, on an average, 0.1-0.4 seed per siliqua. The yield was very low because of lower number of seed produced by each plant. Only the basal siliquae produced some seeds. The maturity period was slightly

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**Table 1. Morphological traits of 15 interspecies hybrids obtained through crosses among varieties of *B. rapa* and *B. juncea***

| Cross | Days to 50% flowering | Plant Height (cm) | No. of primary branches/ plant | No. of Secondary branches/ Plant | No. of siloqua/ Plant | Seed size | No. of seed/ siliqua | Days to maturity |
|---|---|---|---|---|---|---|---|---|
| SAU Sarisha 1× Rai 5 | 38 | 109 | 7 | 8 | 200 | Small | 0.3 | 121 |
| SAU Sarisha × BARI Sarisha 10 | 40 | 115 | 8 | 9 | 370 | Medium | 0.2 | 119 |
| SAU Sarisha 1 × BARI Sarisha 11 | 41 | 107 | 8 | 10 | 455 | Small | 0.1 | 117 |
| BARI Sarisha 6 × Rai 5 | 39 | 107 | 6 | 11 | 432 | Bold | 0.1 | 121 |
| BARI Sarisha 6 × BARI Sarisha 10 | 42 | 105 | 6 | 11 | 377 | Medium | 0.2 | 124 |
| BARI Sarisha 6 × BARI Sarisha 11 | 44 | 139 | 8 | 13 | 301 | Medium | 0.2 | 127 |
| SS 75 × Rai 5 | 37 | 111 | 7 | 15 | 203 | Small | 0.1 | 119 |
| SS 75 × BARI Sarisha 10 | 39 | 117 | 7 | 16 | 287 | Small | 0.3 | 121 |
| SS 75 × BARI Sarisha 11 | 39 | 132 | 8 | 14 | 331 | Small | 0.2 | 113 |
| BARI Sarisha 15 × Rai 5 | 37 | 111 | 6 | 11 | 365 | Medium | 0.4 | 116 |
| BARI Sarisha 15 × BARI Sarisha 10 | 38 | 108 | 7 | 13 | 389 | Small | 0.3 | 117 |
| BARI Sarisha 15 × BARI Sarisha 11 | 37 | 131 | 6 | 14 | 221 | Medium | 0.2 | 115 |
| Tori 7 × Rai 5 | 35 | 108 | 7 | 16 | 187 | Small | 0.3 | 99 |
| Tori 7 × BARI Sarisha 10 | 36 | 96 | 8 | 17 | 151 | Small | 0.2 | 98 |
| Tori 7 × BARI Sarisha 11 | 36 | 105 | 7 | 18 | 189 | Small | 0.2 | 97 |

higher than the *B. rapa* parental genotypes but more or less similar to *B. juncea* varieties. The $F_2$ seeds obtained would be grown in the coming season to allow elimination of B genome chromosome as the materials could be stabilized as AA.

**Table 2. Backcrossing of interspecies hybrids along with *B. rapa* varieties and number of backcrossed seed produced**

| Backcrosses | No. of seed produced |
|---|---|
| (SAU Sarisha 1× Rai 5) × SAU Sarisha 1 | 15 |
| (SAU Sarisha 1 × BARI Sarisha 10) × SAU Sarisha 1 | - |
| (SAU Sarisha 1 × BARI Sarisha 11) × SAU Sarisha 1 | 10 |
| (BARI Sarisha 6 × Rai 5) × BARI Sarisha 6 | 20 |
| (BARI Sarisha 6 × BARI Sarisha 10) × BARI Sarisha 6 | 5 |
| (BARI Sarisha 6 × BARI Sarisha 11) × BARI Sarisha 6 | 30 |
| (SS 75 × Rai 5) × SS 75 | 5 |
| (SS 75 × BARI Sarisha 10) × SS 75 | - |
| (SS 75 × BARI Sarisha 11) × SS 75 | 20 |
| (BARI Sarisha 15 × Rai 5) × BARI Sarisha 15 | 17 |
| (BARI Sarisha 15 × BARI Sarisha 10) × BARI Sarisha 15 | 14 |
| (BARI Sarisha 15 × BARI Sarisha 11) × BARI Sarisha 15 | 11 |
| (Tori 7 × Rai 5) × Tori 7 | - |
| (Tori 7 × BARI Sarisha 10) × Tori 7 | 9 |
| (Tori 7 × BARI Sarisha 11) × Tori 7 | 17 |

In the second experiment, the $F_1$ seeds were grown along with the five parental varieties of *B. rapa* to carryout backcrossing. The idea is to enhance the elimination of B chromosomes along with the recovery of *B. rapa* genes in the plants through successive backcrossing programme. Three cross combinations produced no seed upon backcrossing with *B. rapa* genotypes. Others, however, produced only a limited member of seeds (Table 2). The number of seeds per cross combination varied from 5-30. Extra care might be taken to have plants out of these minimal numbers of backcrossed seeds in the next cropping season.