significant. Thousand seed weight and ascorbic acid content were positively correlated and this was due to the direct effect of 1000 seed weight on ascorbic acid content. The indirect effect of 1000 seed weight via other characters were small and negligible.

The results revealed that the ascorbic acid content was positively correlated with each of 1000 seed weight, fruit stalk weight, pedicel length, fruit length, number of fruits/plant and capsanthin content and among the independent variables, the direct effect of 1000 seed weight was maximum followed by fruit length. The residual effect in the investigation was high due to the fact that many other independent variables like environmental factors and other plant traits (Reeves, 1987) not included in the study influenced the quality traits.

On the basis of present investigation, it appears that selection procedures i) based on stem height upto 3rd internode length, ascorbic acid content and fruit stalk weight may be used to improve the capsanthin content ; ii) based on fruit weight coupled with fruit length may be used to improve the capsaicin content and iii) based on capsaicin content, number of fruits/plant, fruit length and 1000 seed weight may be used to improve the ascorbic acid content.

REFERENCES

BENNET, D.J. and KIRBY, G.W. (1968). Constitution and biosynthesis of capsicum . **J.Chem.Soc.Lon., 4:** 442-446.

DEWEY, D.R., and LU, K.H. (1959). A correlation and path coefficient analysis of components of crested wheat grass seed production. **Agron. J.,51:** 515-518

HARRIS, L.J. and RAY, S.N. (1935). Ascorbic acid. **Lancet 1:** 462.

HERNANDEZ, H.S. and SMITH, P.G. (1985). Inheritance of mature fruit colour in *Capsicum annuum* **J.Hered., 76:** 211-213.

NAVARRO, F. and COSTA, J. (1991). Colour evaluation of selected capsicum . **Capsicum Newsl. 10:** 45-46.

PALACIO, R.J. (1977). Spectrophotometric determination of capsaicin. **JAOAC., 60:** 970-972.

SHIFRISS, C. and PILOWSKY, M. (1992). Studies of the inheritance of mature fruit colour in *Capsicum annuum* L. **Euphytica 60:** 123- 129.

SNEDECOR, G.W. and COCHRAN, W.G. (1967) **Statistical Methods.** The Iowa State University Press, Iowa, U.S.A.

WOODBURY, J.E. (1977). Determination of capsicum pungency by high pressure liquid chromotography and spectro fluorometric detection. **JAOAC., 63:** 556-558

(Received : January 1995 Revised: March 1995)

Madras Agric. J., 82(12): 634-636 December 1995
https://doi.org/10.29321/MAJ.10.A01285

THE BEHAVIOUR OF ALTERED MALE STERILE LINES IN PEARL MILLET

G.KANDASAMY and R.SETHUPATHIRAMALINGAM

Horticultural College and Research Institute
Tamil Nadu Agricultural University
Periyakulam

ABSTRACT

Five male sterile AxB combinations involving alternate B lines (81A x 3383B, 81A x pb 305 B, 3383A x 81B, pb 302A x pb 305B, pb 403A x pb 405B) were chosen and nine altered A lines were developed by transferring the genome of alternate B lines at 50 per cent and 75 per cent levels. Studies on the altered A lines indicated the possibility of altering the morphological expression of a A line by changing B lines. The differences between the original A lines and altered A lines were found to be significant. This may be due to the interaction of the genome of the alternate B line with the genome of original A line. For example, the altered A lines of 81A flowered earlier than the original A line and the difference was significant (81A x 3383B). The choice of appropriate b lines for altering A lines appeared to be very important. Transfer of genome from one B line to another A line at 50 per cent level appeared to be effective in improving the morphological expression and thus F1 sterile lines could be profitably utilised in developing three-way crosses.

KEY WORDS : Altered A lines, 50 and 75 per cent Transferred genome, F_1 male sterile line

Inbred male sterile lines because of their uniformity are found to be more susceptible to environmental variation and diseases. Further, some of the male sterile lines are sensitive to photoperiod and temperature (Rai and Witcombe,

1985). Hence, an attempt was made to diversify the male sterile lines by using alternate B lines.

MATERIALS AND METHODS

Five elite sterile combinations with 50 per cent altered genome (81A x 3383B, 81A x pb 305B, 3383A x 81B, pb 302A x pb 305B, pb 403A x pb 405 B) were utilised for conversion with new genomic contents. These constituted altered A line with 50 per cent transferred genome (TG) from alternate B lines. These five sterile F1 were backcrossed with their respective male parent (A X B^2) so as to obtain five male sterile lines with 75 per cent of genomic contents substituted. The line (81A x pb 305B) x pb 305B which showed partial fertility was rejected from further study. The nine altered male sterile lines *viz.*, 81A x 3383B, 81A x pb 305B, 3383A x 81B, pb 302A x pb 305B, pb 403A x pb 405B, 81A x $3383B^2$, 3383A x $81B^2$, pb 302A x pb 305 B^2 and pb 403A x pb $405B^2$ and their parental male sterile lines (81A, 3383A, pb 302A, pb 305A, pb 403A, pb 405A) were evaluated for five traits *viz.*, days to 50 per cent flowering, plant height, number of productive tillers per plant, panicle length and panicle girth, in a randomised block design with three replications. For each entry, 20 plants were raised in a row of three m length per replication. This study was done at the Regional Research Station, Tamil Nadu Agricultural University, Vridhachalam during 1987-89.

RESULTS AND DISCUSSION

The differences between the original A lines and altered A lines were evident for the five traits compared (Table 1). For days to 50 per cent flowering two altered A lines of 81A exhibited earliness significantly than their original unaltered A line. Similarly, the altered A lines of 81A, pb 302A and 403A expressed significantly higher values than their respective original A lines for plant height. Also superiority of the altered A lines could be seen for number of productive tillers per plant, panicle length and panicle girth. This indicated the possibility to change the expression of morphological traits of a male sterile line by crossing it with an alternate B line.

Some of the altered A lines were found to be late for days to 50 per cent flowering with less number of tillers per plant as compared to original A lines. For example, all the altered A lines of 3383A flowered late and produced lesser number of tillers than the original A lines i.e., 3383A. Therefore, the choice of appropriate B lines for altering A lines appears to be important.

In the transfer of genome from one B line to another A line, even a single dose seems to be sufficient to improve the characters. But, when 81B was used on 3383A significant increase in plant height was not found with single dose of transfer (at 0.5 TG). However, at double dose of transfer (at 0.75 TG), a significant increase in plant height was found, Sivasamy (1988) reported similar result for plant height in Sorghum. At ICRISAT (1990), the increase in plant height in F_1 male sterile lines" was reported to be due to the elimination of the effects of inbreeding depression. They were also of the opinion that F_1 male sterile line can be used for producing three way hybrids with early pollinators that flowers too early to be sued in late flowering A line.

In this study, among all altered A lines, the line 81A x 3383 B (with 0.5 TG) was found to be superior than original A line (81A) for four characters viz., earlyness, plant height, tillers per plant and panicle girth. In general significant superiority was achieved with 0.5 TG level itself for most of the characters. Eventhough many of the altered A lines with 0.5 TG and 0.75 TG levels exhibited significant superiority over respective original A lines, the differences between altered A lines with 0.5 TG and 0.75 TG levels were not significant in most of the altered A lines. Hence it is also suggested that diversification of A lines with 0.5 TG level (i.e., F_1 male sterile line) is enough for further exploitation.

The use of altered male sterile (0.5 TG) seed parents offers several potential advantages. It will produce more seed in hybrid seed production plots than an inbred male sterile because of its hybrid vigour. A good male sterile line that has become susceptible to downy mildew could still be used as parent of a F_1 male sterile seed parent. The F_1 male sterile seed parent is likely to be resistant because of the dominant inheritance of disease resistance. By judicious selection of parents, F_1 male sterile seed parents could be

Table 1. Mean expression for five characters

Male sterile lines	Days to 50 per cent flowering	Plant height (cm)	No. of productive tillers/plant	Panicle length (cm)	Panicle girth (cm)
81A	45.3	88.1	3.2	16.4	5.2
81A x 3383B	39.0	125.3	5.2	19.8	6.6
81A x 3383B^2	37.3	103.6	7.0	16.7	5.5
81A x pb 305B	47.7	129.2	2.6	19.9	5.5
3383A	34.0	85.2	6.7	10.8	3.6
3383A x 81B	43.3	97.3	4.9	15.5	4.9
3383A x 81B^2	43.3	107.3	4.4	17.3	5.4
pb 302A	35.0	99.2	4.1	16.7	4.5
pb 302A x pb 305B	37.3	131.1	47.	22.8	6.0
pb 302A x pb 305B^2	36.0	128.3	3.8	24.1	5.7
pb 403A	35.3	67.6	3.9	10.4	5.8
pb 403A x pb 405B	38.0	102.5	4.2	14.9	5.7
pb 403A x pb 405B^2	38.7	136.1	3.2	19.0	5.9
pb 305A	38.0	129.6	3.3	20.3	5.4
pb 405A	43.0	130.5	2.9	15.5	5.5
Mean	39.4	110.7	4.3	17.3	5.4
CD (P=0.05)	2.0	14.8	0.8	2.5	0.6

produced, that combine the advantageous traits of both inbred parents without their disadvantages. Such altered steriles with 0.5 TG (F_1 sterile lines) could be profitably utilised in making three way hybrids.

REFERENCES

ICRISAT (International Crops Research Institute for the Semi-Arid Tropics) (1990). **Annual Report, 1989.** Patancheru, Hyderabad, India.

RAI, K.N. and WITCOMBE, J.R. (1985) Development of new male sterile lines in pearl millet. Paper presented at the **All India Co-ordinated Millets Improvements Project Workshop,** Rahuri, 26-19 April 1985.

SIVASAMY, N. (1988). Studies on Altered male sterile lines and their hybrids in Sorghum *(Sorghum bicolor* (L.) Monech.) Ph.D., Thesis. TamilNadu Agricultural University, Coimbatore.

(Received : September 1993 Revised: December 1994)

Madras Agric. J., 82(12): 636-638 December 1995

NUTRIENT REMOVAL BY WEEDS AS INFLUENCED BY FLUCHLORALIN, MOISTURE REGIMES AND SEEDING METHODS IN GROUNDNUT

K.VAIRAVAN and S.SANKARAN

National Pulses Research Centre
Tamil Nadu Agricultural University
Vamban 622 303

ABSTRACT

Field experiments were conducted at the Agricultural College and Research Institute Madurai to study the loss of nutrients by weeds in groundnut during the summer of 1990 and 1991 The nutrient removal by weeds was greatly influenced by gradient moisture regimes. Application o limited water (3.18 cm) through line source sprinkler registered the lowest removal of nitrogen an phosphorus by weeds. The impact of seeding methods on the nutrient removal was not significant Pre emergence application of fluchloralin @ 1 kg/ha followed by hand weeding on 30 DAS, helpe in preventing the loss of nutrients by weeds.

KEY WORDS : Nutrient Removal, Weeds, Groundnut

The weeds are capable of taking up nutrients more vigorously up to 75 days after sowing (DAS) in groundnut field. Good weed controls check the nutrient loss by weeds and helps in better uptake