

## Some considerations in hybrid sorghum seed production in Nicaragua

**Sumario.** Para evaluar los factores que limitan la producción de semilla de sorgo (*Sorghum bicolor* (L.) Moench) en Chinandega, Nicaragua, se llevaron a cabo ensayos con un cambio en la época del año en que el sorgo usualmente es sembrado en Nicaragua. También se probaron varios espaciamentos de hileras y proporciones de hileras hembras vs hileras machos. Se encontró que tanto el espaciamento de hileras como las pruebas sobre proporciones de hileras hembras vs machos no resultaron tan importantes como para afectar el establecimiento de semilla. Por lo tanto, se deberán utilizar combinaciones de espaciamento de hilera y proporción de hileras hembras vs machos que resulten más económicas para la producción de semilla. Pero se encontró que la fecha de la siembra era un factor único que contribuye en gran parte al aumento del rendimiento de semilla. Se recomienda la siembra en campos de semilla bajo la irrigación durante enero-febrero (Verano) para evitar la fumigación aérea de insecticidas a los progenitores maternos de la mayoría de los híbridos del sorgo. La siembra en agosto-setiembre (tierra seca - postrera) deberá probarse en las áreas donde no se cultiva el algodón.

For past several years, private seed companies are trying to produce hybrid sorghum seed in Nicaragua. Though there is no formal report of such activities, to the author's knowledge most of their attempts have failed. It was believed that poor morning winds and high temperature affected pollen dispersal and viability. Also reddish-brown leaf coloration, poor plant growth and panicle development limited female seed yields. Most of these earlier trials, (including one of the author) were planted in August - September (Postrera), usual time commercial sorghum (dryland) is planted in Nicaragua. A few production trials were conducted to further investigate the factors affecting female seed yields in sorghum production fields. This report briefly discusses conclusions drawn from these trials conducted in 1976 at the Tropical Research Station of Pioneer Hi-bred International Inc, located in Chinandega, Nicaragua.

Three of the Pioneer hybrids, W823, 8417 and 8202, recommended for Central America, were chosen for this study. All the three hybrids shared the same male parent ('Restorer'), on three different female parents (A lines). Seeds of all the four parents was obtained from the parent seed division of Pioneer Hi-bred International Inc, in Plainview, Texas.

In order to understand the causes underlying failures in seed production, following variations from the previous production methods were made:

1. Time of planting: Instead of planting rainfed in August-September (Postrera), this trial was planted under irrigation on February the 10th, 1976, (Verano)
2. Ratio of male vs. female rows: Most grain sorghum production fields in U.S. are planted in a ratio of

12:4 of female vs male rows (2). In order to evaluate pollen mobility narrow ratios, such as 2:1, 3:1, 4:2, 6:3 and 6:2, of female vs. male rows were tested

3. Distance between rows: Commercial sorghum is usually planted in Nicaragua at a rate of 25-40 lb per acre, in rows 7"-9" apart without any consideration to the effect of within row plant spacing. On the other hand most commercial US sorghum is planted in 30" and 40" rows with an adjustable seed rate. All the planting in this study was done in rows North-South (across the usual wind direction in the area), by a corn planter using sorghum seed plates, placing seed about 2" apart.

All seed plots covering an area of about eight acres received a total of 120 lb of nitrogen per acre. Plots were irrigated at about 10 days interval. Data were taken on per cent bloom in male and female parent, incidence of diseases, total seed yield. In addition to total seed production, the average seed yield of female and male parent was recorded by drawing 10 random samples of 20 each (row length) from each row.

Due to several reasons, actual data of these trials are not available for publication, but the author strongly felt that the findings of these experiments may prove to be quite valuable to both private and public Central American organizations involved in the Seed Industry. Following conclusions were drawn from these trials:

Per cent bloom data indicated that nicking of the male and female parents for the three hybrids, originally developed for U.S. market, posed no problem in a semi-tropical environment. For 8417 nick was perfect. 8202 female was a few days (3-5 days) earlier and W823 female a few days (3-5 days) later than the male parent. In spite all the three females had fair to good seed set.



Fig 1.—Insecticide leaf burn in a sorghum nursery near Chinandega, Nicaragua



Fig. 2.—A sorghum seed production plot near Chinandega, Nicaragua. Note the centre female rows showing a good seed set.

The reddish brown leaf coloration (Fig. 1) often encountered in 8417 female, was laboratory analyzed and identified as insecticide (Lorsban) burn. It had affected all the three females but to a much lesser extent than that observed in August-September planting. It was noted that the severe leaf burn problem affecting female plants in August-September planting was due to aereo-spray insecticidal drifts from cotton fields. This was avoided in January-February (Verano) planting. It is now thought that all the seed fields planted either in non-cotton growing season or in non cotton growing areas are likely to be free from this problem. However, areas where foliar application of insecticides at earlier stages of plant is required, leaf burn resistant female parents should be developed.

On female parent of all the three hybrids seed set was excellent over what has been observed in previous years (Fig. 2). However, 8417 had better average seed yield (2911 lb ac) than 8202 or W823 females (2038 lb ac). This was largely attributed to, (i) nicking problem and, (ii) comparatively slender panicles in females of W823 and 8202. Nicking problem can be corrected easily by a parent bloom study. This will enhance female seed fields.

Among ratios 2:1, 3:1, 4:2, 6:3, and 6:2 average seed yields were not significantly different, indicating that pollen movement was not a problem. Yield comparisons among female rows adjacent to, and farther from their respective male row, also confirmed this. It is recommended therefore, that wide ratios of 12:4 and 18:6 be tested in Central America.

The 8202 female parent planted in rows 24" apart gave better yields than in rows spaced 18" or 30" apart. But the yield differences were not significant, indicating that the three plant populations were suitable for production. However, narrow row plantings are recommended because they provide better weed control, more effective feeding area around each plant, and a better canopy that lowers soil temperature and decreases evaporation (1). For planting in 18", 24" and 30" rows approximate seed requirements (assuming 25%

stand loss) were 16, 12.5 and 10 lb per acre respectively. However, higher seed rates have been recommended for irrigated sorghum (3). These recommendations should be tested.

May 2nd, 1977.

D. C. SHARMA  
DIVISION OF TROPICAL RESEARCH  
UNITED FRUIT COMPANY  
LA LIMA, HONDURAS

#### REFERENCES

1. KRAMMER, N. W. and ROSS W. M. Cultivation of grain sorghum in the United States. *In Sorghum production and utilization*. Ed. by Wall and Ross. Westport, Con., Avi, 1970. pp 167-169.
2. QUINBY, J. R. and SCHERTZ, K. F. Sorghum genetics, breeding hybrid seed production. *In Sorghum production and utilization*. Ed. by Wall and Ross. Westport, Con., Avi, 1970. pp 73-117.
3. WORKER, G. F. Sorghum seeding rates for best yields. *California Agriculture* 31:4. 1977.

### Algunos datos biológicos sobre una especie de *Anadasmus* (Lepidoptera, Stenomatidae) asociada con el aguacate, *Persea americana*, en Brasil

**Abstract.** The larvae of *Anadasmus vacans* (Meyrick) NEW COMBINATION, were found feeding on the leaves of avocado, *Persea americana* Mill near to Sete Lagoas, State of Minas Gerais, Brasil. They make a resistant, irregular and conical tube among the leaves, in which they remain protected. When young, the larvae eat the parenchyma of the surfaces of the leaves; later on they destroy all the leaf, avoiding the main vein and the basis of the secondary ones.

En dos ocasiones (1969 y 1974) el autor tuvo la oportunidad de recolectar orugas de un lepidóptero que que se alimentaba de las hojas de aguacate, *Persea americana* Mill, en Sete Lagoas, Minas Gerais, Brasil. De esas orugas emergieron algunos adultos que fueron identificados como *Stenoma vacans* Meyrick, 1916 (Stenomatidae), una especie conocida solamente por algunos ejemplares recolectados en el Río Maroni, Guayana Francesa.

Trátase de un insecto encontrado por primera vez en Brasil y cuyo hospedante, formas jóvenes y biología eran desconocidos. Como pertenece a un grupo de insectos poco conocidos desde el punto de vista biológico, es interesante registrar los datos obtenidos como una contribución al conocimiento del grupo, y así como al conocimiento de los aspectos sanitarios de esa importante planta tropical.

#### *Posición taxonómica del insecto*

Cuando Meyrick (2) describió esta especie en 1916, la asociación al género *Stenoma* Zeller, que incluye actualmente más de 500 especies neotropicales, el cual necesita ser revisado por contener especies pertenecientes a