PD-AAW-713
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AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D.C. 20523

DATE: 10/19/87

MEMORANDUM

TO: AID/PPC/CDIE/DI, room 209 SA-18

FROM: AID/SCI, Victoria Ose VO

SUBJECT: Transmittal of AID/SCI Progress Report(s)

Attached for permanent retention/proper disposition is the following:

AID/SCI Progress Report No. 6.106
PR for Jan - Jun 87 rec'd 9/28/87

Attachment

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KH/A10/10 of 1984

6.106

Field Studies.

Evaluation of germplasm.

Experiment I : Further evaluation of 60 cultivars received from the FAO collection.

The sixty varieties were screened in a Randomized complete block design with two replications during Maha 86/87. MI 1 served as control.

Experiment II : Evaluation of 100 varieties in a simple lattice design.

A new experiment was designed to evaluate the recently collected germplasm. Experiment was planted in a simple lattice design during Maha 86/87.

Experiment III : Major yield trial of leading sesame cultivars.

Twelve leading varieties identified sofar were planted in a major yield trial in four replications using a randomized complete block design. MI_3 the only white seeded cultivar recommended in Sri Lanka served as control.

Experiment IV : Induction of mutations in sesame and selection of useful traits.

Dry seeds of high yielding cultivar MI_2 was irradiated with 10 doses (from 10 Kr to 100 Kr) of gamma rays and each M_1 plant was harvested separately. M_2 progenies were planted on a plant to row basis in Yala 1987 and useful mutants were identified for harvesting.

Experiment V : Evaluation of sesame germplasm for response to two photoperiods.

During maha artificial light was used to compare the effect of normal short day and long day on 32 varieties originati in different countries. 32 varieties in 3 replications under two day lenghts in a factorial design was used. In yala 87 the F_1 and parents from a diallel cross involving the same varieties as Maha 86/87 are being grown under two day lengths to study the inheritance of day length response.

(Contd...../02

Experiment VI : Evaluation of high oil varieties.

Selected varieties for high seed oil content are being tested in a field experiment in a randomized complete block design with 2 replications. The experiment isstill in the field. (Yala 1987).

Experiment VII : Disease screening of part of the germplasm for soil borne pathogenic fungi.

Seventy five varieties were grown in three replications in a Randomized Complete Block experiment. The plants were artificially inoculated with Fusarium spores cultured in laboratory.

Experiment VIII : Identification of insect pests of sesame and screening of germplasm for pests.

An experiment with 20 cultivars in three replications is being conducted (Yala, 87) to identify insect pests of economic importance and to find varietal differences in susceptibility.

Experiment IX : Studies on water requirement of four sesame cultivars.

Three varieties with contrasting characters are grown in a pot experiment with nine moisture regimes to find out the water requirements of sesame crop. The varieties included are MI_2, Institute 71, UCR. 13.

Hybridization : Hyoridization programme is being successful y continued with inclusion of high oil varieties, disease resistant varieties and those with specific characteristics useful in improving yield and/or intensification of the crop.

The diallel crosses completed in Maha 86/87 are being repeated to obtain F_1 and F_2 seeds to be grown in the same experiment, along with the parent varieties to study different genetic factors governing the inheritance of various characters.

(Contd...../03.

Laboratory Studies :

01. Testing of sensitivity of Alternaria sesamicola (a fungal pathogen of sesame) to different concentrations of Ridomil (AI-84% mancozeb and 10% metalaxyl) in vitro.

0.1, 10, 100 µg ai/ml of corn meal agar was used in this study. The cultures were incubated at 28°C and the diameter measured every 24 hrs.

02. Isolation of fungal pathogens, their culture and identification.

Four different fungal species affecting sesame in different parts of the southern dry and intermediate zones have been isolated and cultured. Cultures have been sent to Commonwealth Mycological Institute for identification.

Data Collected :

In variety trials all the cultivars were studied for their morphological characters at seedling, flowering and maturity phases, according to FAO sesame description and a variety catalogue (data base) is being made in the computer. The characters studied are listed in the previous report (Pg. 6-8).

The biometrical data including seed yield was measured and analysed in the computer statistically for each of the biometrical character. Statistical analysis was completed only for experiment I (sixty varieties) and III (twelve varities), Entry of data in other experiments is being done presently.

seeds of more than 150 F_1 combinations were harvested.

Results and Discussion:

Experiment I - Planted on 30th October, 1986. The statistical analysis of the data on plot yield and other related characters have shown.(When MI 1 - recommended cultivar is taken as the control) that

a) No variety has a significant difference for number of capsules (mean of 10 plants) per plant

b) RFA 31, RFA 25 and RFA 76 significantly exceed the height to first capsule

c) The flowering time of RFA 56 is earlier (significant at 5% level) than MI 1.

d) Thirteen varieties are significantly lower in plant height and only one (RFA 76) is taller than MI 1.

e) RFA 76 and RFA 25 have recorded a significantly higher number of nodes per plant

f) Mean height to first flowering node was significantly low in 21 varieties

g) Plant height at flowering significantly low in 25 varieties, of which 19 are same as in(f) above.

h) Three varieties RFA 17,20,32 exceeded the length of capsule of MI 1 significantly and that of RFA 66 was significantly lower than MI 1.

i) 21 varieties which mature earlier than MI 1 were identified

j) RFA 31 and RFA 76 have significantly higher plant dry weight

k) None of the varieties exceeded the seedyield of MI 1. However, 17 varieties were found to be significantly lower in yield than MI 1.

Estimation of many characters in this collection has revealed several varieties which can be used as donors of different advantageous traits. These varieties are included in the hybridization programme.

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Experiment II

The feeding of data for statistical analysis is not complete yet. On average plot yield basis RFA 155 exceeded MI 2 (control) by 28.2%.

Experiment III

The statistical analysis of yield and major yield components revealed that none of the varieties tested have a significant yield advantage over the recommended variety. However, several varieties with early maturity, 3 capsules per leaf axil, long capsule, increased seed size etc. have been identified to be used in the hybridization programme.

Experiment IV

Part of the M_2 Progenies were grown in Yala, 1987. Several selections for early maturity, three capsules per leaf axil (MI 2 has one capsule per leaf axil), compact plant, more capsule setting were isolated and selected. No plants with sterility could be isolated. However two late maturing plants with changed flower were found.

The corolla segments were free and the stamens turned at an angle away from stigma. Capsule setting was poor and therefore the flower was artificially pollinated and also crossed to several other varieties to maintain the gene. This character is expected to be of much use in developing a cross pollinated plant which will be useful in the future hybrid sesame programme proposed by us.

Experiment V

Although statistical analysis of data is not complete, from the data obtained it is obvious that the early flowering, short statured varieties are less responsive to changes in day length. When the day length was artificially increased the dry weight of the plant, number of capsules per plant, internode length, plant height and the seed yield have increased. This effect was more pronounced in late maturing varieties originating in the tropics.

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We increased the daylength from normal Maha (11 hrs. 40 min.) to 12 hrs. 30 min. which is usual in the tropics.

Experiment VI

The experiment has not been harvested yet.

Experiment VII

The experiment was not successful as the conditions prevailing during the Yala 1987 season were not conducive for disease development. We are using the trial to evaluate the germplasm. The harvesting and data collection is not yet complete.

Experiment VIII

Experiment is not complete yet. Antigastra catalaunalis has been the most devastating pest in the experiment. Other pests collected will be identified with the help of an Insect Taxonomist.

Experiment IX

The experiment was planted in late May and no conclusions can be made.

Hybridization

More than 150 cross combinations with three complete diallel crosses were completed during Maha 86/87. In Yala 87 some new combinations and two diallel crosses are repeated.

Invitro studies in alternaria control have shown that mycelial growth is completely inhibited at 10 and 100 µg a.i. Ridomil per ml. of agar.

Is the work on schedule ? Yes. More experiments than planned have been planted.

Plan of work for the next half year :

Grow new germplasm (local and exotic) and part of the old collection.

(Contd...../07.

Continue backcrossing in disease resistance breeding.
Three way crosses to combine characters.
Repeat earlier crosses and new crosses (about 30).
New diallel cross with eight varieties.
Segregation studies for photoperiod reaction using diallel crosses.
Evaluation of M_3 progenies and selection in M_2 progenies of gamma ray treatment of MI 2 variety.
Grow M_1 of EMS and DES treatment of three varieties.
Study of new mutants and their maintenance.
Continue preliminary trials with promising selections at Embilipitiya, Dry Zone.
Collections of germplasm in different parts of the country - Hambantota, Monaragala and Ratnapura Districts.
Send part of collection, F_2 seeds to collaborators.
Visit sesame improvement programme at Hebrew University.

Any other remarks :

Study visit to collaborating project Dr. A. Ashri could not be undertaken during the year I. Approval is hereby sought to undertake this visit during the 2nd year.

Mahaweli Authority of Sri Lanka (walawe special area) has kindly granted the permission to use one of their farms near Embilipitiya to evaluate the promising selections. This programme will be undertaken during the coming season.

Signature of the grantee.

Comments of the Head of Department. Field and laboratory studies were conducted for the satisfaction of the Department.

Signature of Head of Department. 7/08/87