REPUBLIC OF SENEGAL

MINISTRY OF RURAL DEVELOPMENT

SENEGALESE INSTITUTE OF
AGRICULTURAL RESEARCH

DEPARTMENT OF RESEARCH
ON CROP PRODUCTION

SYNTHESIS OF THE RESEARCH ACTIVITIES ON COWPEA PATHOLOGY 1988

BY
D.G. GAIKWAD

DECEMBER 1988

NATIONAL CENTER OF
AGRONOMICAL RESEARCH, BAMBEY

Screening against major diseases was the main research activity during 1988. This included a disease nursery, screening for virus resistance in the field as well as in the screen house and screening for bacterial blight resistance in the screen house. Virus transmission studies, both through seed and by the insects, were continued during this year also. Similarly a statistical yield out experiment for estimation of yield loss due to virus was conducted. Chemical control of ashy stem blight was a new research activity initiated in 1988. Highlights of the results of all these experiments are summarised in the following paragraphs.

I. Resistance screening for major diseases :

1.1. Screening for virus resistance :

A field trial consisting of 48 breeding lines from advanced generations and 4 varieties was conducted at Djibelor for evaluating their virus resistance. All the 5 advanced generation entries from the cross 58-57 x IT 81D 1137 which were repeated 4 times in all the sub trials developed virus infection. However, mild type as well as less virus infection was developed on 2 lines viz., 2'75 N and 283 N. Out of other 43 breeding lines, 22 were free from virus. Amongst the varieties B 21 and TVx 3236 were resistant while 58-57 and Ndiambour were susceptible

All these entries togetherwith few more entries were screened in the screen house under artificial inoculation. Out of 65 entries, 37 breeding lines and 4 varieties viz., B 21, TVx3236, IT 84S2246-4 and CB5 showed resistant reaction. 58-57, Yougne and Ndiambour were susceptible. The following 15 breeding lines were observed to be free of virus in the field as well as in the screen house test. 365 N, 368 N, 369 N, 371 N, 405 N, 408 N, 411 N, 414 N, 415 N, 416 N, 421 N, 422 N, 429 N, 430 N and 432 N.

1.2. Screening for bacterial blight resistance :

A set of 65 entries comprising of 58 breeding lines from advanced yield trials and 7 varieties were screened in the screen house by artificial inoculation. The results indicated that 42 breeding lines and 3 varieties viz., Mougne, TVx3236 and IT 84 S 2246-4 are resistant to bacterial blight. Bacterial blight was seen on 58-57 for the first time. Out of 1[illegible] breeding lines which were found resistant to virus, the following 13 lines were also found to be resistant to bacterial blight. 365 N, 368 N, 369 N, 405 N, 408 N, 411 N, 414 N, 415 N, 416 N, 422 N, 429 N, 430 N and 432 N.

Thirty five virus resistant single plant selections of 275 N and 283 N made during the season were screened against bacterial blight in the screen house by artificial inoculation. From thits screening 9 of 275 N and 2of 283 N bacterial blight resistant plants were obtained which will be used in the crossing program.

1.3. Disease nursery :

Out of 120 entries which comprised of 79 varieties and 4 breeding lines, 46 varieties and 11 breeding lines were observed to be virus free. Some of elite breeding lines (275 N and 283 N) showed mixture of resistant and susceptible plants. Virus resistant plants were selected from these lines for further testing. Hacterial blight development in the disease nursery was poor. Only 7 entries developed bacterial blight infection mostly on the stem. Macrophomina blight was very heavy in the disease nursery which might have suppressed the development of other diseases. Only 19 entries were found to be resistant to Macrophomina blight. Cercospora infection was developed late. 27 entries were rated as susceptible while 9 were observed to be almost free. Choanephora pod rot and web blight were not seen this year in the disease nursery. Two entries viz., 78-36 and 59-20 were foucd resistant to all 4 diseases.

II. Virus transmission studies :

2.1. Transmission through seed :

The trial was conducted at 2 locations viz., Bambey and Djibelor. There were three treatments in the trial conducted at Bambey viz., infected seed, healthy seed and farmers ' seed. Infected seed showed 5.04% virus incidence while 1. .06% virus infected plants were seen in. healthy seed , Farmers' seed exhibited 2.46% virus contamination. The germination percentage in infected seed and farmers' seed was much low than healthy seed . In the Djibelor trial where only farmers' seed of a local variety was üsed, on an average 5.79% virus infection occurred through seed.

2.2. Transmission by insects :

The trial at Bambey for virus transmission through seed was further contined to see the effect of occurrence of aphids on the spread of virus. The observations recorded 42 days after sowing revealed that the virus incidence was increased from 5 .04% to 23 .44% in the infected seed while it was increased from 1 .06% to 17.41% in the healthy seed. Farmers' seed also showed increase in virus incidence from 2.46% to 19.08%. All these increases were due to transmission of virus by aphids.

III. Estimation of loss in yield due to virus :

The results of a statistically laid out trial conducted at Bambey revealed that there was significant reduction in yield of unprotected plots due to more virus incidence. The loss was estimated to be 30% (343 Kg/ha) in this trial. The results of correlation stcdies between disease incidence and the yield further showed that with the increase in the virus incidence there was significant reduction in the yield.

IV. Chemical control of ashy stem blight :

Ashy stem blight caused due to Macrophomina phaseolina was a serious disease on cowpea in 1987. Hence an experiment was initiated this year for its control with 4 seed dressers at different doses. The results of the experiment revealed that seed treatment. with granox gives satisfactory seed germination. It is also effective against Macrophomina infection in the early crop growth stage. However ,no chemical was found effective under high disease pressure in the later stage. When these chemicals were tested in vitro in the laboratory, granox proved its superiority over all other treatments.

V. Survey of cowpea diseases

Disease situation during 1988 crop season was serious in respect of mosaic diseases. A very high virus incidence was observed on 58-57 in all the cowpea areas. However, the incidence of other diseases was much less as compared to previous years. As usual bacterial blight was the main disease on B 21. Some of the B 21 fields were badly affected. For the first time bacterial blight was seen on 58-57. Macrophomina blight, which had very serious during 1987 season, was seen sporadically in some of the fields. However, it was quite serious in the Pathology Field at Bambey , Incidence of web blight as well as choanephora pod rot was very low. Cercospora leaf spot, though serious on some of the entries, occured late. Brown blotch was seen on CB5 at Bambey. Bacterial pustule was comparatively more, it was seen in some of the minikit trials mostly on CB5, Ndiambour and B21. This year striga was seen at 4 locations. Its incidence was quite serious at Ndatt Fall, Sine Dieng and Keur Boumi.

VI. Summary :

Out of 65 entries tested against virus the following 15 breeding lines were observed to be virus free both in the field as well as in the screen house test. 365 N, 368 N, 369 N, 371 N, 405 N, 408 N, 411 N, 414 N, 415 N, 416 N. 421N 422 N, 429 N, 430 N and 432 N.

Amongst the varieties B 21, TVx 3236 and IT 84 S 2246 - 4 were resistant to virus.

Out of 15 breeding lines found resistant to virus, the following 13 lines were also resistant to bacterial blight. 365 N, 368 N, 369 N, 405, 408 N, 411 N, 414 N, 415 N, 416 N, 422 N, 429 N, 430 N and 432 N.

A disease nursery of 120 entries comprising of 79 varieties and 41 breeding lines yielded 19 entries resistant to Macrophomina blight and 57 resistant to virus under a heavy disease pressure of both the diseases. Incidence of other diseases was minor. Two entries viz., 78-36 and 59-20 were found resistant to all 4 diseases.

In the virus transmission studies 5.04% transmission through seed was recorded in the infected seed while it was 1.06% in the healthy seed. The farmers' seed showed 2.46% and 5.79% virus contamination at Bambey and Djibelor respectively. Subsquently there was substantial increase in the virus incidence at Bambey due to aphids.

The results of the experiment on estimation of yield loss due to virus revealed that there was 30% 343 Kg/ha) yield loss due to virus.

In a chemical control experiment agr-inst ashy stem blight granox was found superior for obtaining good germination. But under the heavy disease pressure at later stage no chemical was found effective.

During survey of cowpea diseases, mosaic virus was found to be wide spread and quite severe in some of the fields particularly of 58-57. Ashy stem blight was spcradic and much less than 1987 season. Bacterial biight was severe in some of the B 21 fields. For the first time bacterial blight was seen on 58-57. Incidence of other diseases was minor. Striga was seen at 4 locations viz. Ndatt Fall, Sine Dieng, keur Boumi and Bambey.