

SALIENT ACHIEVEMENTS

Agricultural Research Station, Vijayarai, Eluru (Dt.)

Maize

I. Generation, study and maintenance of maize inbred lines

- Studied twenty S_2 generation populations and selected 205 single plants from 14 crosses randomly and selfed and promoted to S_3 generation for evaluation during Rabi 2023-24. Evaluated 43 single plants pertaining to 6 crosses in S_3 generation and selected and selfed 27 plants and promoted to S_4 generation for evaluation during Rabi 2022-23. Selfed 45 single plants in S_4 generation from 21 crosses and simultaneously crossed with the testers LM 13, LM 14, CML 581 and CML 582

II. Development of single cross maize hybrids suitable for Andhra Pradesh

- *Kharif 2022*: During *Kharif 2022*, studied 353 F_1 s. Among them 56 hybrids were found promising and remaining S_1 s are inferior in cob length, kernels number and kernel yield entries when compared to commercial check hybrids and hence rejected. Among 56 S_1 s, 12 hybrids were found promising over the best check P 3396 (6417Kg/ha) and top ranked hybrids are PH 421305 (7667 Kg/ha), PH 421176 (7500Kg/ha) and PH421035 (7333Kg/ha). Out of 353 S_1 populations, 16 S_1 s were promoted to S_2 generation for utilizing in inbred development programme.
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- *Rabi 2022-23*: During *Rabi 2022-23* made 144 fresh crosses and studied 353 F_1 s in Initial Hybrid Trial. In Initial Hybrid trial-Set I, the hybrid PH 421111 recorded highest kernel yield of 10600 Kg/ha followed by PH 421051 (10117 Kg/ha) and PH 421102 (10050Kg/ha) where as the best check P3396 recorded 9800 Kg/ha indicating the highest heterosis of 8.16% by the hybrid PH 421051 over the best check P 3396
- In Initial Hybrid Trial-Set II, 35 hybrids were evaluated along with 5 checks during Rabi 2022-23. The hybrid PH 421143 recorded highest kernel yield of 11350Kg/ha followed by PH 421301 (11491Kg/ha). The best check Bio 9544 recorded kernel yield of 10833.3 Kg/ha
- In Advanced Hybrid Trial out of eight hybrids tested, the hybrids AHT5 recorded highest kernel yield of 9933.33 Kg/ha followed by AHT7 (9619.05 Kg/ha) and AHT6 (9309.52 Kg/ha)

III. Evaluation of single cross Maize hybrids

MLT-Maize

- *Kharif 2022*: In *Multi Location Trial* on Maize, during *Kharif 2022*, 11 entries replicated twice were evaluated at MRC, Vijayarai. All the entries showed significant differences for cob yield and kernel yield. The entry PH 1534 recorded highest kernel yield of 6014 Kg/ha followed by PH 42014 (5647 Kg/ha) and PDHM 171213 (5525 Kg/ha). The overall mean of the trial is 4836 Kg/ha. During *Kharfi 2022* due

to continuous rains crop growth affected. Among these three, only PH 1534 yielded better than the best check NK 6240 (5806 Kg/ha)

- *Rabi 2022-23: In Multi Location Trial* on Maize, during *Rabi 2022-23*, 6 entries replicated 4 times were evaluated at MRC, Vijayarai. All the entries showed significant differences for cob yield and kernel yield. Among them the check hybrid P3567 recorded highest kernel yield of 13354 Kg/ha followed by PH 420016 with 11585Kg/ha.

IV. Evaluation of single cross hybrids and inbreds developed by CYMMIT

Kharif 2022: 45 entries replicated twice were evaluated during Kharif 2022. Among them six entries recorded >8t/ha kernel yield. The hybrid No. 39, 67, 76 and 30 recorded kernel yield of 8833, 8438, 8292, 8271 Kg/ha while the mean yield of the trial is 6228 Kg/ha.

V. Collection, cataloguing and utilization of diverse maize germplasm

136 germplasm lines received from CIMMYT-India, ICRISAT Campus, Patancheru were maintained and characterised during 2022-23 at ARS, Vijayarai

Honey Bees & Pollinators

I. Standardization of hives for stingless bees rearing

Out of five sizes of bee hives tested for rearing of stingless bees, highest brood, honey and pollen was recorded in 18x24x17 cm bee hive box with super chamber extension followed by 32x12x12 cm bee hive box compared to other sizes. Lowest development was recorded in 14x10.5x11.5 cm bee hive box.

Foraging activity of Stingless bees was recorded at 9.00 am , where significantly highest number of incoming pollen loads were recorded in 32x12x12 cm (5.24/2 min) and highest nectar loads were recorded in 37x9x10 cm (9.06 / 2 min) followed by 32x12x12 cm (8.97/2 min). The no. of outgoing foragers were highest in 18x24x17 cm bee hive. Highest number of foragers with pollen and nectar was recorded in 32x12x12 cm and 37x9x10 cm (5.08 & 9.53 / 2 min) at 1.00 pm. Highest pollen loads were recorded in 32x12x12 cm at 3.00 pm (4.97/2 min) and nectar loads in 18x24x17 cm bee hive (8.98/2 min), at 3.00 pm where as in 18x24x17 cm highest outgoing foragers were recorded at all times of the days during the study.

- II. Standardization of rearing methodology for carpenter bees (*Xylocopa sp.*)
- Rearing of carpenter bees was taken up by keeping different diametered bamboo poles of one year old were kept in pollinators pandals erected at 3 different places in the farm and raised sunhemp crop in 2.5 acres.
 - At three locations pandals were erected in the pandals and Bamboo nodes with 1.00 cm to 2.70 cm were kept for nest construction by *Xylocopa fenestrata*. Highest percent acceptance was notice in 1.00 cm (77.83%) followed by 1.5 cm (71.42%).
 - Highest number of *Xylocopa fenestrata* were recorded on sunhemp flowers at 3.00 pm (0.71/2 min) and highest number of flowers were visited at 1.00 pm (0.62/2 min) and lowest time spend by carpenter bee at 9.00 am (2.33 /2 min).
 - Highest number of *Xylocopa fenestrata* were recorded on Redgram flowers at 3.00 pm (0.65/2 min) and highest number of flowers were visited at 1.00 pm (0.45/2 min) and lowest time spend by carpenter bee at 9.00 am (4.22 /2 min).
- III. Artificial domiciliation of non-apis pollinators
- Results revealed that in Tamarind species richness (S) was found highest (9), followed by Brazil plant (7) (*Acrisis arborescens*, Solenaceae) and it was (6) in redgram, sunhemp and diancha. Least was in Hibiscus sabdariffa and soapnut (5).
 - Highest no. of sticks were accepted by *Megachile* during the month of December, 2022 (107 no.s) with 3.72% acceptance followed by in May, 2022 (68 no.s) with 3.06 % acceptance. Lowest sticks were accepted for nest construction during September and October, 2022 (0.67%).
 - Highest number of *Megachile lanata* were recorded on Sunhemp flowers at 1.00 pm (0.55/2 min) and highest number of flowers were visited at 1.00 pm (1.11/2 min).
 - Highest number of *Megachile lanata* were recorded on Redgram flowers at 1.00 pm (1.54/2 min), highest number of flowers were visited at 1.00 pm (4.90/2 min) and lowest time spend by *Megachile disjuncta* at 9.00 am (1.03 /2 min).
 - *Saccharum spontaneum* sticks were arranged in 3 locations in the farm in pandals. Different diameter (0.8 – 1.25 cm) were used for the study among them the sticks with 1.00 cm diameter were more accepted (83.47%) followed by 0.95 cm (8.15%) and 1.10 cm.
- IV. Evaluation and efficacy of bio acoustic/ woofer devices for management of green bee eater birds (*Merops sp.*)
- Predatory green bee eater birds incidence were recorded in the apiaries at ARS, Vijayarai. Highest no. of birds were recorded at 3.00 pm (50.99) followed by 9.00 am (47.32) and the number of birds on electrical wires and bee attacking birds at 3.00 pm (61.41 & 20.91).

- V. Fabrication and evaluation of reduced brood chamber and number of frames in bee hives of *Apis mellifera*
- Highest brood development was recorded during October, 2022 (2637.14 cm²) in 7 framed bee hive box followed by eight framed bee hive box (2620.54 cm²).
 - Highest sealed nectar has been recorded during June, 2022 in 10 framed bee hive (1283.08 cm²).
 - Highest egg laying was noticed in December, 2022 (719.17 cm²), where as pollen during October, 2022 (567.59 cm²).
 - In Eight frame bee hive highest brood rearing and egg laying (1660.06 cm² & 425.53 cm²) was recorded followed by seven frames (1608.61 cm² and 400.21 cm²). In Ten framed beehives highest pollen stores were recorded (366.36) compared to seven and eight framed bee hives.
 - Highest pollen was noticed during October, 2022 (567.59 cm²).
 - Regarding wax moth incidence, more number of wax moth larvae were recorded in 8 framed bee hive box (405 nos), followed by 7 framed (367).



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