Effect of Sowing Date on Yield and Yield Components of Cowpea (Vigna unguiculata (l.) walp) in Mubi North Local Government Area, Adamawa State, Nigeria.

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Abstract: This study was conducted at the Teaching and Research Farm of the Department of Crop Science, Adamawa State University, Mubi during 2009 raining season to evaluate the effect of sowing date on yield and yield component of cowpea. The trial consists of 4 sowing date of cowpea viz: (SD1) 25th July, (SD2) 1st August, (SD3) 8th August and (SD4) 15th August 2009 respectively. Treatments were laid out in a randomized complete block design (RCBD) and replicated four times. The land was cleared, ploughed, harrowed, leveled and marked in to blocks and plots with 1m between replication and 0.5 between plots. Cowpea seeds were sown by dibbling 3 seeds per hole at 70cm x 25cm spacing. Seedlings were later thinned to two plants per stand two weeks after sowing. The results obtained were subjected to Analysis of Variance (ANOVA) and means separated using Duncan's Multiple Range Test(DMRT). The parameters measured includes: plant height (cm) at flowering, number of branches per plant, number of leaves per plant, days to 50% flowering, leaf area (cm), number of pods at harvest, weight of 1000 (g), weight of shelled plants and yield (tons/ ha). The results obtained revealed that sowing date significantly ($P<0.05$) influenced the yield and yield component of cowpea in Mubi. SD3 recorded the highest yield of (5.93t/ha) with SD1 recording the lowest yield of (5.05t/ha) which was significantly different from other treatments The significance of this study to Agriculture therefore, is that it is very necessary to know the most appropriate sowing date before planting cowpea in any agro-ecological zone of the country for enhanced yields.

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Key Words: Sowing date, cowpea, Yield components, Mubi, Nigeria

1. Introduction

Cowpea (Vigna unguiculata (l.) Walp) is an herbaceous short term annual leguminous plant which is grown in many tropical and sub-tropical countries (Singh and Sharma, 1996). It originated in Africa and it may be came an integral part of traditional cropping systems throughout Africa, particularly in the semi-arid region of West Africa savannah (Mortimore et al., 1977). Faris (1965) based his evidence on the presence of wild progenitors of cowpea in West and Central Africa postulated that, West Africa was the center of domestication of cowpea. Cowpea is widely grown throughout Africa, Australia, Asia, low Coastal South American, West Indies and the Southern part of United State of America..In Nigeria, Adamawa State is one of the major producing state (Adejobi and Ayinde, 2005) as evidenced by the availability of the produce in most market and also the consumption rate by most household. FAO (2006) estimated that, 4.5 million tons of cowpea dry grains were produced worldwide in 2005 and 75% of that production was from Africa and Nigeria produced 2.4 million tons of this, making it the largest producer , followed by Niger (650,000t), Mali (110,000t). Other producers are South Africa, (21%), Europe (1%), Asia (2%), North America (1%). Total area grown globally was 14.0 million hectares and about 9.3 million hectares of these was located in West Africa with about 5.0 million hectares in Nigeria.

Yield of cowpea have been reported to consist of three primary components, viz: number of pods per plant, number of seeds per pod and 1000 seeds weight *(Malik and Singh, 1983). Yields are low in humid areas because of the diseases and* insect damage. In Nigeria, average yield is about 457.4kg/ha (FMA, 2000) which is far below the yield capacity of the crop. Some of the reasons advanced for low yield of cowpea in Nigeria includes;vagaries of weather conditions, lack of proper protection measures as well as inadequate knowledge of the sowing date and in appropriate use of fertilizer (Tenebe et al., 1995). Under recommended practice good management, yield of between 1500-2000 kg/ha are easily possible (Onwueme and Singh, 1991) although Blade, et al (1997) have reported that with sole crop, grain yield potential is 1500-3000kg/ha under good management. Although Nigeria is a leading producer of cowpea in the world, grain yield per hectares are generally low. This low yield could be attributed to in adequate information on the sowing date, which could have reduced high incidence of insects pest, diseases and weeds problems (Katung and Ngu, 2003) .In Sub-Sahara Africa, Mortimore et al (1997) reported low cowpea plant establishment population per unit area as a major factor responsible for the low yields obtained for the small holder farming system. They recommended cowpea spacing within such system to be highly variable (35-90cm). Kayode and Odulaja (1985) reported that grain yield in the wetter savanna of Mokwa zones could be maintained if inter-row spacing wider than 60cm while intra-row spacing of 15cm and 30cm which ensure yield stability with no significant effect on severity of diseases is recommended for all the cultivars.

2. Materials and Methods

The study was carried out at the Teaching and Research Farm of the Department of Crop Science Adamawa State University Mubi during the 2009 cropping season. Mubi lies between latitude 10^0 18^1 North of the Equator and longitude 13^o 11^1 East of the Greenwich Meridian. It is bounded in the North by Borno State, in the West by Hong and Song local government area in the South by Mubi South local government area and in the East by Republic of Cameroon. Temperature is normally warm to hot through out the season. Minimum temperature can be as low as 12^oc and as high 37^oc. The mean annual rainfall is 1000mm (Adebayo, 1997). The cowpea (prostrate type/kanannado) local variety was obtained from Mubi market. The trial consist of four sowing dates of cowpea (25^{th} July, 1^{st} August, 8^{th} August and 15^{th} August 2009 respectively). Treatments were laid out in a randomized complete block design (RCBD) and replicated four times. The total land area of the experiment was 462.5m^2. Each plot was 5m x 4m (20m^2), with 1m between replication and 0.5m between each plot. The land was cleared, ploughed, harrowed and leveled using cutlass, rake and hoe. Sowing was done by dibbling 3 seeds per hole, at 70cm within row and 25cm between row and seedling were later thinned to two per stand two weeks after emergence. Two hoe weeding were carried out at three weeks and six weeks after emergence respectively which ensured that weeds competition were kept under control. Starter dose Nitrogen fertilizer was applied at 20kg N/ha as recommended by Prasad (1985). The fertilizer was applied through broadcasting. Cowpea pod were harvested by hand picking the pods when they were ripe and dry. The harvested pods were threshed manually by beating the harvested pods with stick and then winnowed. The shelled beans were taken to the laboratory and weighed using a digital scale. Plant heights were measured using a meter rule. The measurement was done from the ground level (base) to the tip of the plant. It was taken at flowering, where four plants were selected randomly from each plot with six plants per row. Number of leaves per plant was determined by counting the number of leaves at flowering on 4 randomly selected plants. Four (4) plants were randomly selected and the number of branches counted to know the branching ability due to the effect of sowing dates. This was taken when the plants were observed to be about 50% flowering. At harvest 4 plants were selected at random from each plot. The pods were counted and weighed. 1000 seeds weight of each treatment tested were determined by counting 1000 seeds and the weight measured using a digital scale. The leaf area at flowering of 4 randomly selected plants were measured using meter rule by taking the length and breadth of the leaf then multiplying by 100.

3. Results and Discussion

The effect of sowing date on the yield and yield components of cowpea is presented in tables 1 to 4. Effect of sowing date were observed to be non significant on plant height, number of branches, number of leaves per plant and days to 50% flowering. This indicate that sowing date in Mubi may only have little or no influence on plant height, number of branches, number of leaves per plant and days to 50% flowering. It was noted that the effect of sowing date was significant ($P<0.05$) on leaf area.

The cowpea sown on the 1st August 2009 (SD1) recorded better performance of leaf area, indicating that sowing cowpea in the 1st week of August increase the leaf area which could improve the photosynthetic ability of the plant. This further support the findings of Singh, et al (2003) who observed that cowpea thrives best at the temperature of between 27°c -35°c with the annual rainfall of 500-700mm per annum for its production. Significant difference in terms of number of pods at harvest, weight of 1000 grains (g), weight of shelled plants and yield (tons/ha) were observed (Table 3 and 4). This observation agrees with the report of Malik and Singh, (1983) that yield of cowpea have been reported to consist of three primary components, viz: number of pods per plant, number of seeds per pod and the weight of 1000 seeds (g).

Number of pods per plant at harvest was highly significant (P<0.05) when sown on the 8th of August compared to 25th July and 1st August. While the cowpea sown on the 15th of August has the lowest pods yield. This implies that, sowing cowpea late will definitely affect the pods yield and consequently the total yield/ha. It was also observed that the cowpea sown on the 8th of August performed better in terms of weight of 1000 grains (g) when compared with the others sown on different dates. This reveals that cowpea sown on the 2nd week of August will lead to yield increase. This result is corroborated by the findings of Futuless and Bake (2010) who reported a higher yield of cowpeas planted in early August in northern guinea savanna zone of Nigeria.The weight of seeds per plant (g) also maintain highest value in terms of weight recorded 44.85 g when sown on the 8th of August, while the ones sown on the 1st and 15th of August recorded weight of 405.65 g and 408.73g respectively. But sowing cowpea on the 25th of July consequently led to reduction in grain weight.

Cowpea grain yield in this study was good (Table 4) in marked contrast to yield of (1500-2000 and 3000kg ha^{-1}) reported by (Onwueme and Singh, 1991 and Blade, et al 1997) under recommended practice and good management. But rather agrees with the report of Muleba and Ezuma, (1985) that current agronomic practices such as date of sowing, plant population, maintenance of soil physical properties and fertility, weeds control and cropping system strongly influenced the yield of cowpea.

Table 1. Effect of sowing date on plant height at flowering and number of cowpea branches per plant.

Sowing dates	Plant height at flowering (cm)	No. of branches/plant at flowering
SD1	24.96_a	11.00_a
SD2	23.87_a	7.75_a
SD3	24.88_a	8.50_a
SD4	26.83_a	10.25_a
LSD(P<0.05)	NS	NS

Note: means with the same letter are not significantly different (Duncan's Multiple Range Test at P<0.05)

Key:

NS: Not significant

LSD: least Significant difference

SD1: 25th July, 2009

SD2: 1st August, 2009

SD3: 8th August, 2009

SD4: 15th August, 2009

Table 2: Effect of sowing date on leaf area at flowering and number of leaves at flowering per plant ..

Sowing dates	Leaf area at flowering	No. of leaves/plant at flowering
SD1	46.76_b	67.25_a
SD2	54.45_a	65.50_a
SD3	50.80_{ab}	58.50_a
SD4	53.05_{ab}	67.85_a
LSD(P<0.05)	*	NS

Note: means with the same letter are not significantly different (Duncan's Multiple Range Test at (P<0.05)

Key:

*: Significant

NS: Not significant

LSD: least Significant difference

SD1: 25th July, 2009

SD2: 1st August, 2009

SD3: 8th August, 2009

SD4: 15th August, 2009

Table 3: Effect of sowing date on days to 50% flowering and number of pods per plant at harvest of Cowpea

Sowing dates	Days to 50% flowering	No. of pods at harvest/plant
SD1	39.00_b	23.75_{ab}
SD2	39.00_a	22.75_{ab}
SD3	28.00_a	27.00_a
SD4	39.00_a	20.50_b
LSD(P<0.05)	NS	*

Note: means with the same letter are not significantly different (Duncan's Multiple Range Test at (P<0.05)

Table 4: effect of sowing date on weight of 1.000 seeds (g), weight of seeds (g) per four plant and yield (tons/ha). Of Cowpea.

Sowing dates	Weight of 1000 seeds(g)	Weight of seeds/four plants (g)	Yield (tons)/ha
SD1	89.50_b	379.33_b	5.06_b
SD2	84.75_b	405.65_{ab}	5.4_{ab}
SD3	104.25_a	444.85_a	5.93_a
SD4	85.25_b	408.73_{ab}	5.45_{ab}
LSD(P<0.05)	*	*	*

Note: means with the same letter are not significantly different (Duncan's Multiple Range Test at (P<0.05)

Key:

*: Significant

LSD: least Significant difference

SD1: 25th July, 2009

SD2: 1st August, 2009

SD3: 8th August, 2009

SD4: 15th August, 2009

4. Conclusion

Based on the results of this trial, it was obvious to note that sowing date strongly influenced the yield and yield components of cowpea in the study area. Moreover, the result showed that the most appropriate sowing date of cowpea in this area is (SD3) which recorded the highest yield of 5.93tons/ha. Based on the finding of the study 8th August, 2009 is recommended for adoption by farmers in Mubi. In order to improve the production and yield of cowpea in the study area, a continuous study must be under taken to present a more stable and reliable information.

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