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Assessment of Consumer Preference for Cowpea Quality Characteristics and Price Trends in Niger State, Nigeria

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Abstract. This study assessed the consumer preference for cowpea quality characteristics and price trends in Niger State. The study employed a random sampling technique to select three markets from three different regions across the State. Systematic selection of 5 retailers from each market was carried out every month for twelve months. Information on relevant cowpea grain quality characteristics most preferred by consumers and its price trend is limited at present in the study area. Results revealed that consumers showed a preference for quality characteristics such as rough texture, white eye, white testa colors and minimum insect damaged grains. Price trends showed increase in prices of cowpea grains from January to July in all markets. It was recommended that Government should provide cowpea grains encompassing all the qualities preferred by consumers. Good storage mediums to combat insect damage to cowpea grain and price stability can be achieved through government intervention.

Keywords: Cowpea Quality, Consumer Preference and Price Trends.

1. Introduction

Cowpeas are one of the most important indigenous African legume crops especially in West and Central Africa. It is regarded as a key protein source for the urban and rural poor and plays an important role as cash crops [1]. As a legume it is highly nutritious and relatively free of metabolites or other toxins and provides an inexpensive source of proteins in a diet [2]. Virtually every developing country has a chronic protein deficiency [3]. As reported by [4], [5] there are increasing cases of malnutrition and many deaths of infants have been attributed to it, it becomes expedient to suggest that increasing consumption of foods rich in proteins is needed [6], [7] reiterated that cowpea as a food source provides the cheapest supplement to the urban and rural poor in Nigeria.

Cowpea is among the major cash and food crops in Africa with Nigeria as the highest consumer in the world, [8]. Cowpeas vary according to the size of the grain, colour of the skin/testa, skin texture, eye colour, amount of damage resulting from insects, sucrose content, grain weight and its cooking time etc. Consumer's preferences stems from the choices made on a combination of these variation. Additionally [9] asserted that consumer characteristics, behaviour and attitudes are ultimate determinants of market conditions. Farmers will be reluctant to grow varieties that consumers will not buy. Producers and merchants will be more likely to adopt storage and post harvest handling technologies that improve the characteristics that consumer's value.

Much attention is paid by economist, agro economists and other theories to the price of a product and other factors such as the price of substitutes and complements, which could have an influence on the price of

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the product under investigation [3]. As important as this information is to assisting in understanding the relation that exists between different products and services, cognizance should however be taken of the fact that the price of a particular product reflects the quality characteristics most desired and preferred by a consumer and the utility the consumer is willing to purchase at a given time and place. If relevant cowpea grain quality characteristics that are most preferred by consumers can be identified and the contribution to price quantified breeders could more accurately assess trade-offs between yield and quality characteristics and therefore anticipate future changes. Further knowledge about the preference placed on quality characteristics of cowpea by consumers could provide useful information for developing agronomical practices and marketing programmes. There is limited information about consumers desired quality characteristics of cowpeas in the North central region of Nigeria. Most research carried out by [10], [11] and [12] centered on the North Eastern region, North Western and South Western regions of Nigeria variously. Other research works focused on production and technology adoption aspects. [13] carried out consumer preference study on cowpea in Niger state using the Hedonic approach. This study employed a descriptive assessment of the quality characteristics of cowpea, drawing up inferences for consumer preference of quality characteristics from the results. Consumer's tastes and preferences are ever changing worsened more so by the ongoing globalization and modernization of cultures in developing countries and also the current transformation of the Agricultural sector in the country. It is important to target cowpea research that meet consumer's tastes and preferences to provide the needed information to producers, to be assured of the markets for their products, breeders and policy makers.

This study was undertaken with the objectives of describing the socio economic characteristics of cowpea retailers, identifying the quality characteristics of cowpea in the study area. Ascertaining the different varieties consumed in the study area and to show the price trends of cowpea in the study area.

2. Methodology

The study employed a price/quality assessment of cowpea from markets in Niger state. The markets in the state were stratified into three, the production region (i.e markets in cowpea producing areas); the transitory region (markets in locations close to highways and interstate routes) and the consumption region (markets located in urban areas). One market was selected from each of these regions including modern market Kontagora (production region), central market Minna (consumption region) and Sabon Wuse market in Tafa (transitory region). Markets were selected according to the volume of cowpea sales, proximity to each other and size of consumers in such locations. Samples of cowpea were purchased from five (5) randomly selected retailers from the three (3) selected markets. This was carried out once a month for a period of twelve months (June 2011- July 2012), giving a total sample size of 180. A systematic sampling was employed in which a randomly chosen retailer was picked first; every 5th seller was then selected, from whom a sample of cowpea was purchased. For each sample of cowpea bought data was recorded on the following variables: Market price per unit of cowpea bought (in Naira), Testa texture, Testa colour, Eye colour, Weight of 100 grains of cowpea, Number of insect infected, broken and discoloured cowpeas, Grain size (millimeters), Selling period (month), Sucrose level (in %) and Cooking time in (minutes).

2.1. Data Entry and Measurement of Variables

Grain weight: For the measurement of the 100 grain weight of cowpea the average weights of 100 grains were recorded. Grain size: Ten grains were selected, their principal dimensions was measured with a vernier caliper. The average length multiplied by width was recorded in millimeters. Testa colour: This was accomplished by visual inspection. Testa texture: Both visual observation and finger touch was used to establish texture identity. To identify cowpea eye colour visual observation was employed. Insect infested grains: was measured through visual observation and counting of grains with holes in them (from 100 grains). Sucrose content: The titration method for sucrose determination was used. Cooking time: The

parallel plate method was used. Data was analyzed through descriptive statistics of pie charts, bar charts, graphs and frequency tables.

2.2. Results and Discussion

2.2.1. The Socioeconomic characteristics of cowpea retailers.

2.2.1.1. Gender of Cowpea Retailers

The gender of retailers from whom cowpea samples were bought are described in Fig. 1. Results showed that retailers were predominantly male. The proportion of the males across the markets studied were 70% in Kontagora market, 76.66% in Sabonwuse market and 86.66% in Minna market.

2.2.1.2. Age of Cowpea Retailers

The pooled age distributions of the retailers presented in Fig. 2 showed that 91.66% were between the age group of 26-51 years, 5% were 52 years and above while 3.33% were between 0-25 years.

2.2.2. Quality characteristics of cowpea from markets studied

2.2.2.1. Testa texture

Two textural classifications for cowpea namely rough and smooth are commonly found. The results in Fig. 3, revealed that more than 50% of the grains were all of the rough textured class in all the markets studied. While for the Minna market, 100% of the testa textures for cowpea grains were all rough. This suggests that consumers prefer the rough skin textured grains.

2.2.2.2. Eyecolour

The colour of the eye of cowpeas can be white, black, grey or brown. In terms of the eye colour, the results showed that the white eye colour was the dominant eye colour in the markets. This contradicts findings of [14] in which dominant eye colours found in markets in Senegal were black and maroon [15] reported also that in North Ghanaian markets consumers preferred cowpeas with black eyes, while in Cameroun they discounted cowpea grains with black eyes. Fig. 4, reveals that 78.33% of the samples had white eye colour, while 21.67% were black eyed. The highest white eye colour was found in Kontagora market at 95%, while Minna and Sabon wuse were 75% and 65% respectively.

2.2.2.3. Testa colour

The testa colour of cowpea grain varies and can be white, brown or red, black, ash, milk or a combination of two colours. The results further show that 58% of the cowpea grains sold had white testa colour, 34% were brown while 8% had milk colour. Fig. 5, presents the spread in terms of testa colour for cowpeas sold in the different markets. The proportion of white testa colour at Sabon Wuse market was the highest at 73.33% while for Minna, it was 60% followed by Kontagora market, 43.33%. This is a likely indication that white testa colour is a more preferred colour by consumers in the study area.

2.2.2.4. Weight of 100 grains of cowpea sample

The grain weight is commonly measured by breeders by weighing 100 randomly selected grains. The results revealed that majority of the markets had grain weights ranging between17-27 grams/100grain weight. The highest grain weight greater than 28 grams/100grain weight was found in Sabon wuse market at 10% (Fig. 6).

2.2.2.5. Grain size

The result from Table 1 reveals that the highest grain size of cowpea was found in Kontagora market at 141.79mm. In product characterization, the grain size is an indication of the dimension and shape of a product. It is generally understood that fewer grains of larger grain sizes are required to fill up a volume of a measuring unit. This invariably benefits the producer and even the retailers. On the other hand smaller grain sizes are easier to crush especially by processors/consumers, while more of the larger grain size is required to fill up a volume of a measuring unit. According to [16] shape and size refers to the characteristics of a product which determines how much space it occupies within limits and can be described in terms of length, width and thickness.

2.2.2.6. Insect damage

Insect damage, consisting of grains with bruchid/insect holes, broken grain, and discoloured grains per 100 grains revealed very high values. The average number of insect damaged cowpeas per 100 grains was

between 12 and 14. The highest rates of insect damage were found in Minna market, while Sabonwuse market had the least (Fig. 7). This can probably be attributed to the improper storage practices and insect attack, particularly caused by the legume pod borer (*maruca.)* The result here contradicts results of [14] and [10], where number of bruchid holes/damage was relatively low (between 6-9 holes/100grains). [17] reported that the advantage of cowpea grain was in their storable nature and all year round availability. They also stated that these grains were highly prone to insect damage. Similar study carried out by [13] showed that insect damage was discounted by consumers in Niger State.

2.2.2.7. Sucrose content

The mean sucrose level among cowpeas across markets ranged from 11.00% and 15.6%. It is evident from the result that the sweetest cowpea were found at Sabon Wuse market followed by Minna market and Kontagora market. This result revealed that cowpeas in Nigeria have higher sucrose content as compared to those found in Senegal at 5.2% and 6.8% [14].

xii) Cooking Time

The average cooking time for cowpea samples was between 17 and18 minutes. This is the minimum cooking time. The cooking time per variety from Fig. 8, revealed that the variety *akapa (achishiru)* had the highest cooking time at 26 minutes 33 seconds, while the least cooking time was found from the variety called *dan drum* at 12 minutes 7 secs.

2.2.3. Varieties of cowpea found in the markets

From the pooled data results in 27 different varieties were identified (Fig. 9). The pooled data reveals that sobo was the highest at 16.11%, followed by *kannanado* at 14.44% and *dan misira* at 11.11%. The least were *silver, dan shuwari, dan Zamfara, jan waken* and *dan Hausa fari* at 1.66% respectively. The varieties *silver* and *dan Hausa fari* were found only in Kontagora market, *dan Shuwari* and *dan Zamfara* were found only in Sabonwuse market while *jan wake* was available only at the Minna market.

2.2.4. Price trends of cowpea from each market studied

Steady price fluctuations of cowpeas were revealed in the months July – December 2012 in all three markets. By the following year 2013, cowpea prices increased in the month of February from ₦99.02/kg ($0.61) to ₦116.80/kg ($0.73) at Kontagora market (Fig. 10) and ₦110.17/kg ($0.76) to ₦122.50/kg ($0.76) at Sabon wuse market (Fig. 11). This increase follows the period after harvest in December were sales are generally low and thereafter begin to climb. The sharp increase in the price of cowpea from ₦116.80/kg ($0.73) in February to ₦172.50/kg ($1.07) in March in Kontagora market (production region) (Fig. 10), could be said to be responsible for the consequent sharp increases in the same months in the other two markets (Fig. 11 and Fig. 12). Price trends showed an increase from ₦200.18/kg ($1.25) in May to ₦291.44/kg ($1.82) in June at Sabonwuse market (transitory regions) (Fig. 11). While an increase of ₦125.69/kg ($0.78) in February to ₦186.25/kg ($1.16) in March was revealed in Minna market (consumption regions) (Fig. 12). The close proximity of Sabon wuse to Abuja the Federal capital territory (FCT), could aso be said to be responsible for the sharp increase of cowpea price from May to June. Consumers from the Nation's capital Abuja usually come all the way to this market to make cowpea purchases.

NOTE: Exchange rates are the current exchange rates in US Dollars ($) between January 2012-December 2013.

2.3. Conclusion

This study assessed consumer preference for quality characteristics and price trends of cowpea in Niger State Nigeria. The study examined quality characteristics of cowpea using descriptive analysis to draw up inferences for consumer preference. It also described the price trends of cowpea at the different markets studied. Based on the research findings, it can be concluded that consumers demonstrate a preference for quality characteristics such as rough texture, white eye colour, white testa colour of cowpea, grain weight of cowpea ranging between 17-27 grams/100 grain weight, minimum insect damage of grains, high sucrose content of between 11-15.6% and minimum cooking time. Findings revealed further that consumers had a

higher preference for the variety *sobo* from the pooled data. Price trends revealed that cowpea prices were generally higher in the months ranging from January – June in 2013. Prices were also found to be low in December following harvest, and general higher in markets in the transitory and consumption regions.

3. Recommendation

Based on the findings of this study the following recommendations and policy interventions were proposed;

1) Government should through the cowpea breeding programmes of research institutes come up with cowpea grains encompassing all the qualities preferred by consumers.

2) Good storage mediums to combat insect damage to cowpea grain should be made available to retailers/marketers to enable them have minimal damaged grains.

3) Price stability of cowpea grains can be achieved all year round, if the Government can buy up grains at periods when the price is at its minimum (i.e. between Octobers – December). They can be stored up in grain reserves (e.g like is been done in the case of cereals) and made available to consumers at periods when the prices have increased.

3.1. Socio Economic Characteristics of Cowpea Retailers

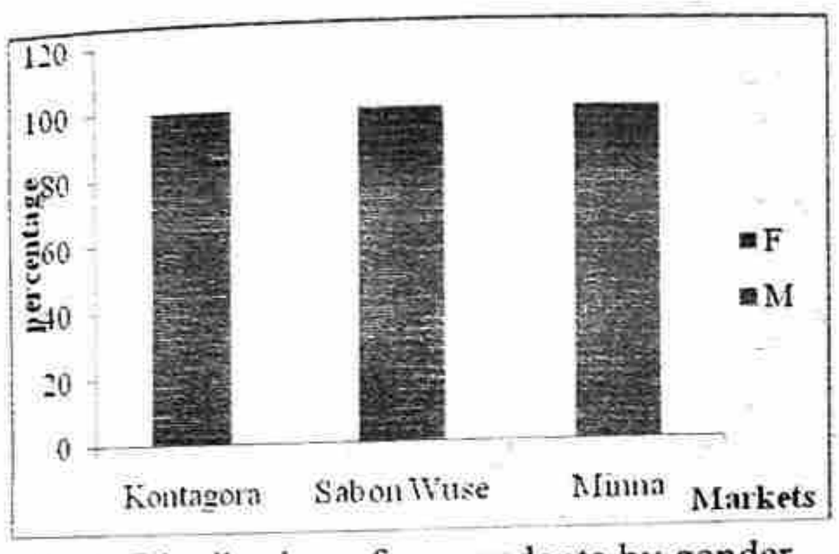

Fig. 1: Distribution of respondents by gender.
(Source: Study Result Output, 2013)

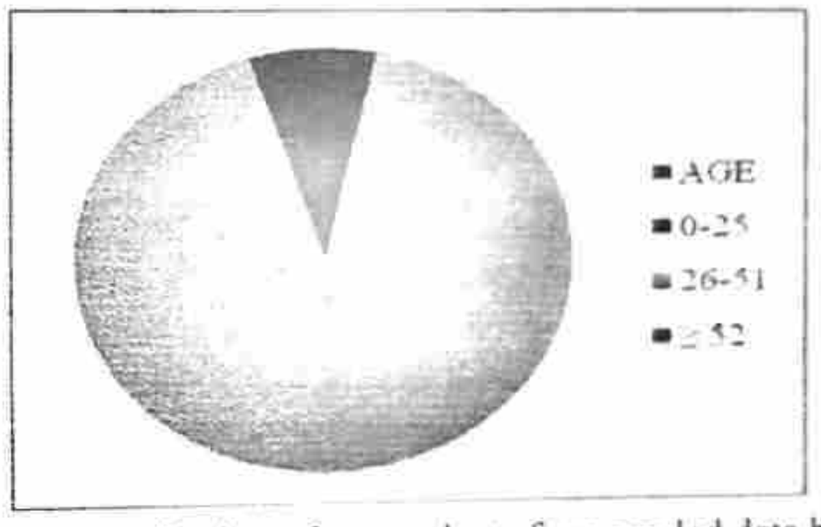

Fig. 2: Distribution of respondents from pooled data by age. (Source: Study Result Output, 2013.)

3.2. Quality Characteristics of Cowpea from Markets Studied

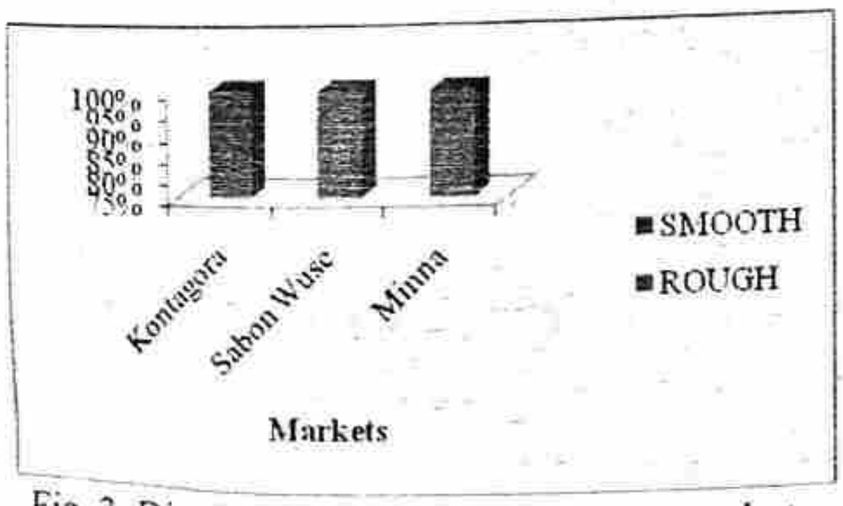

Fig. 3: Distribution of testa texture by markets
(Source: Study Result Output, 2013)

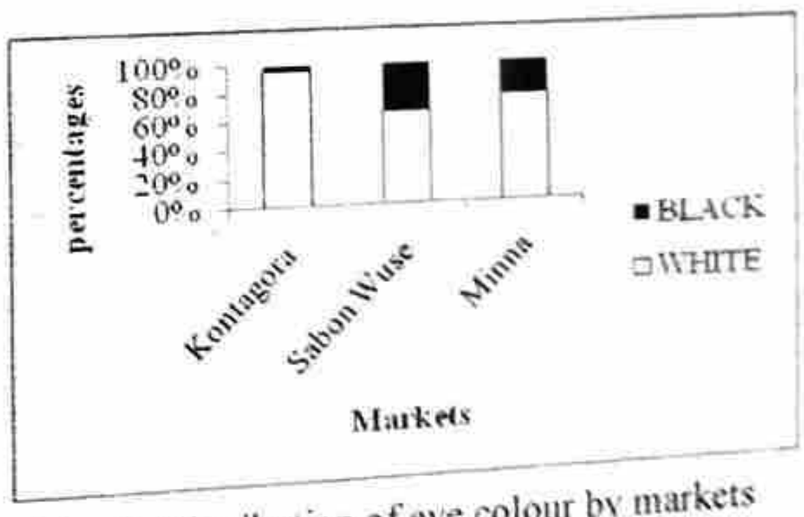

Fig. 4: Distribution of eye colour by markets
(Source: Study Result Output, 2013)

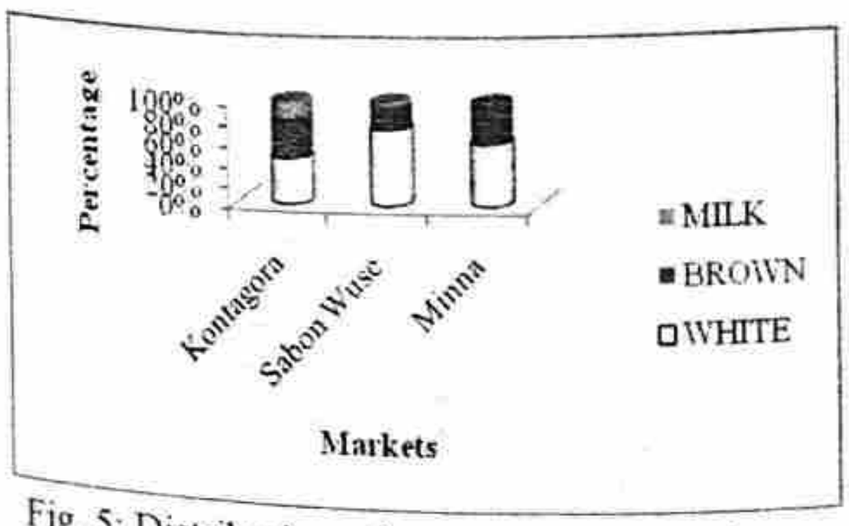

Fig. 5: Distribution of testa colour by markets
(Source: Study Result Output, 2013)

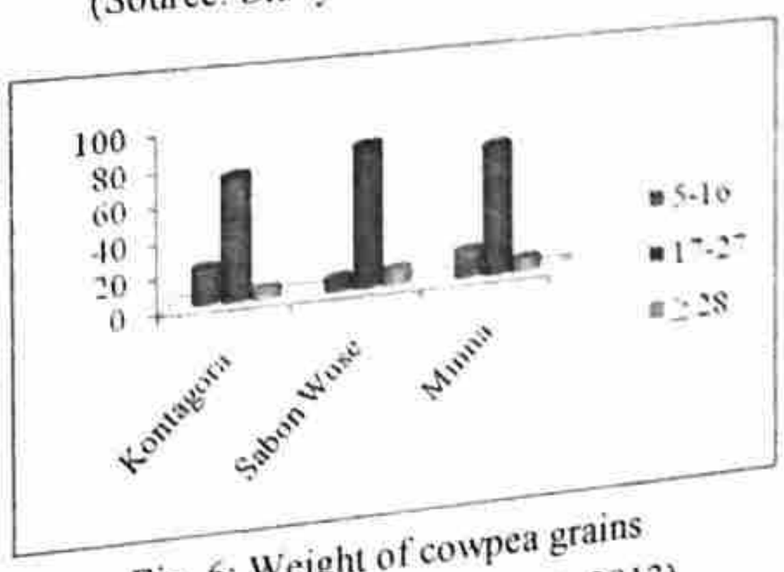

Fig. 6: Weight of cowpea grains
(Source: Study Result Output, 2013)

Table 1: Summary Statistics of Cowpea Grain Size in selected markets in Niger State.

Item	N = 60	Kontagora	Sabon -Wuse	Minna
Grain Size (millimeters)	Mean	70.07	55.09	61.99
	St. Dev	32.49	38.58	38.14
	Minimum	0.53	0.33	0.16
	Max	141.79	111.25	120.68

Source: Study Result Output, 2013

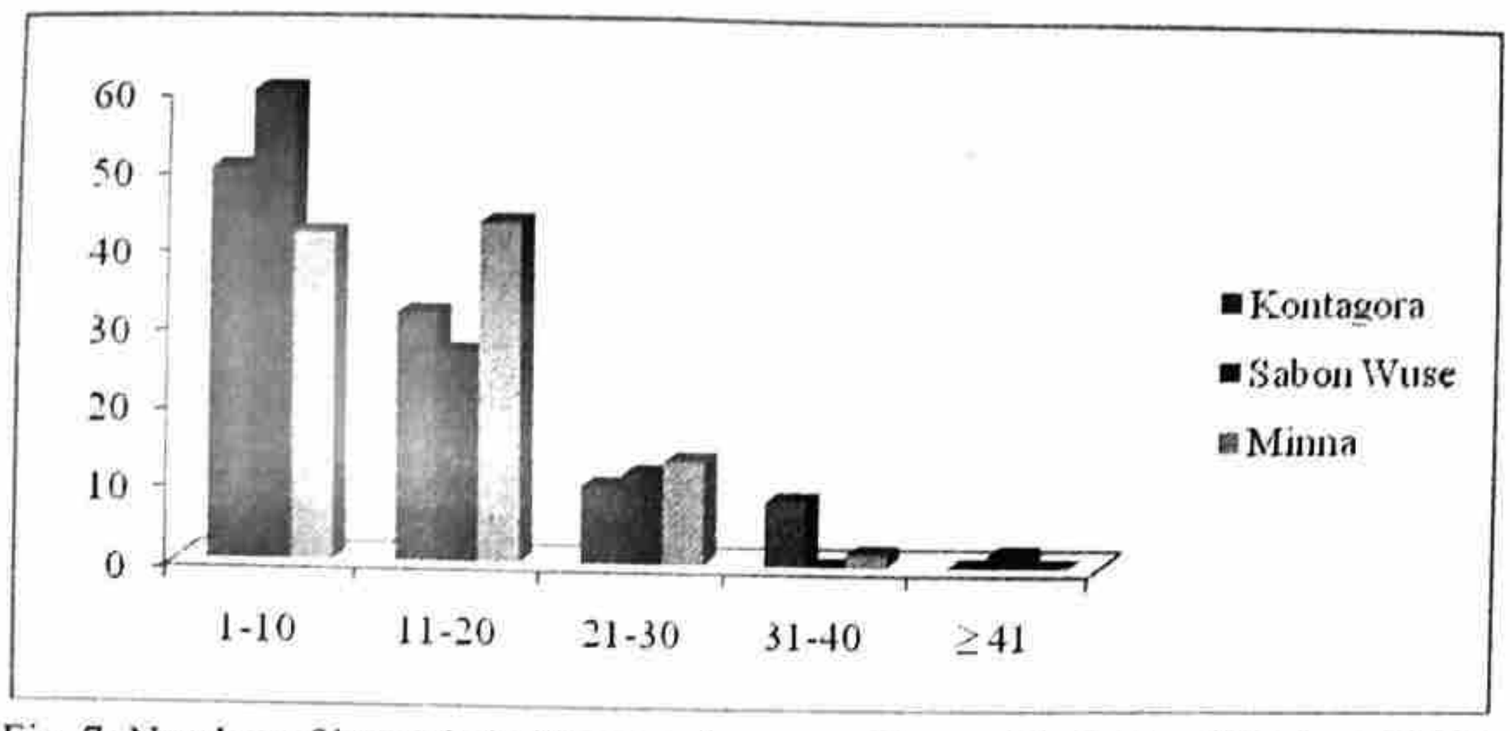

Fig. 7: Number of insect holes/Damaged cowpea (Source: Study Result Output, 2013)

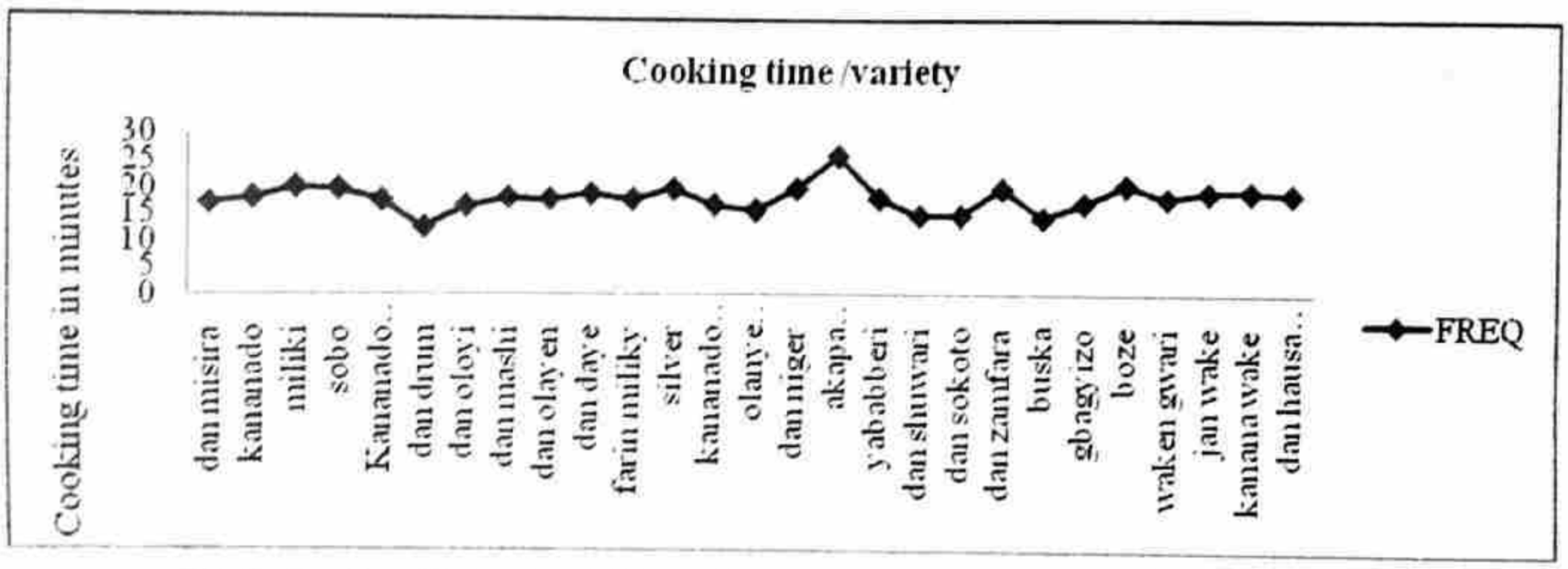

Fig. 8: Cooking Time of varieties of Cowpea (Source: Study Result Output, 2013)

3.3. Varieties of Cowpea in all Markets (Pooled)

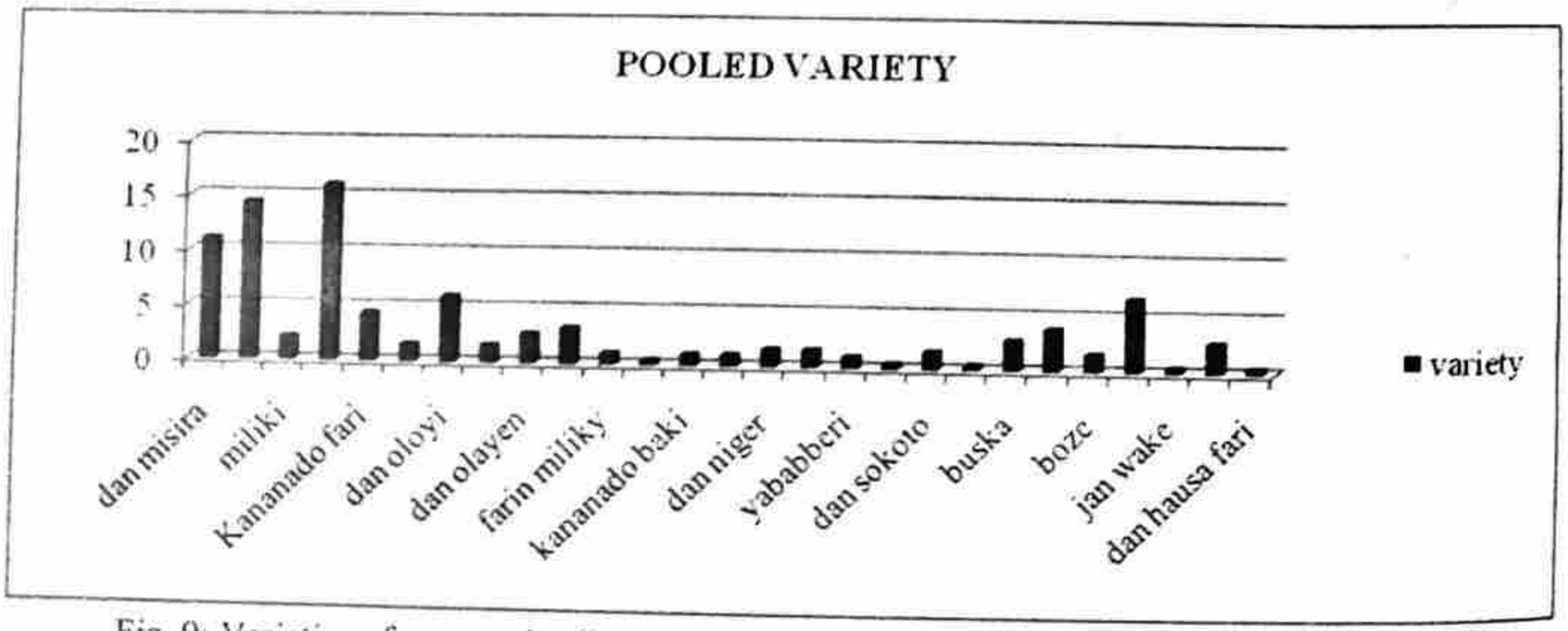

Fig. 9: Varieties of cowpea in all markets (Pooled) (Source: Study Result Output, 2013)

3.4. Price Trends of Cowpea in Markets

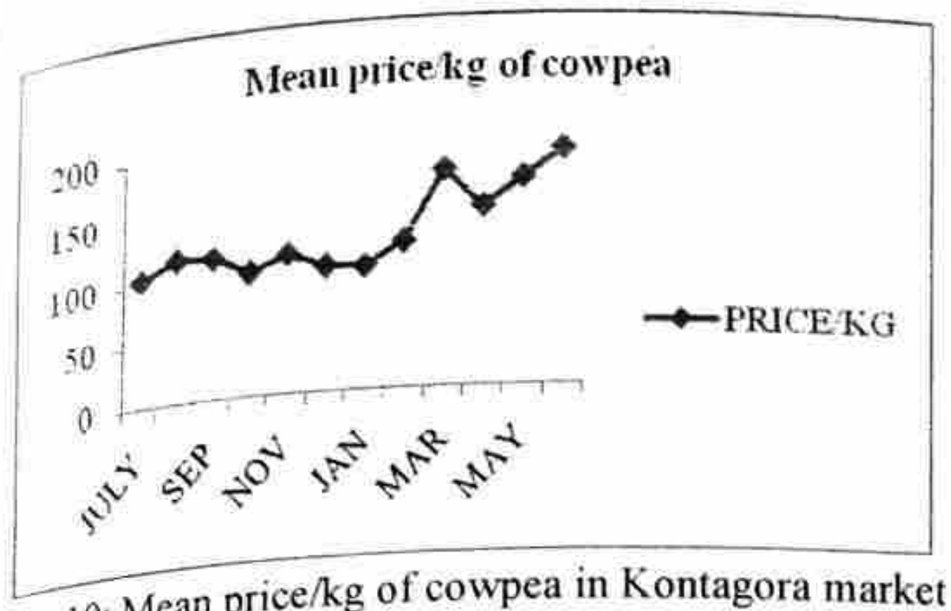

Fig. 10: Mean price/kg of cowpea in Kontagora market (Source: Study Result Output, 2013)

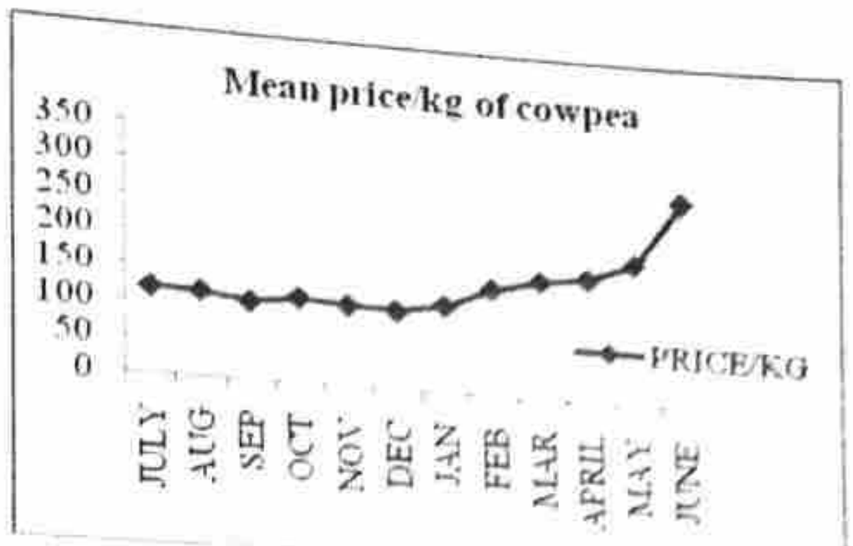

Fig. 11: Mean price/kg of cowpea in Sabon wuse market (Source: Study Result Output, 2013)

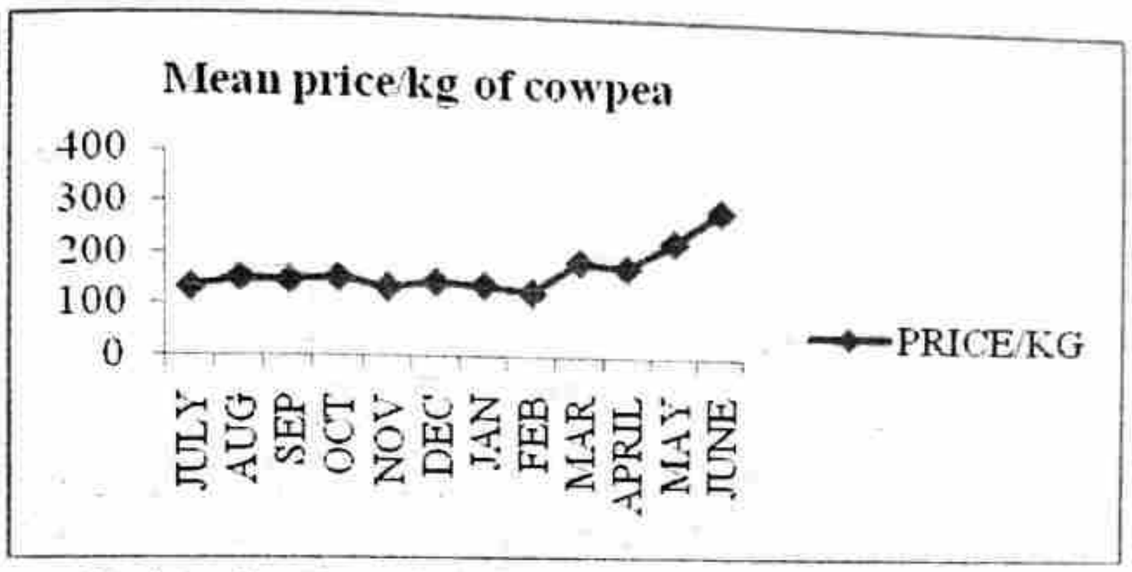

Fig. 12: Mean price/kg of cowpea in Minna market (Source: Study Result Output, 2013)

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