



Original Research Article

Feeding Preference of Kolanut Weevil (*Balanogastriis kolae*) (Coleoptera: Curculionidae) for Different Types of *Cola nitida* Nuts

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Abstract	Keywords
<p>The feeding preference of the weevils was determined under laboratory conditions of 27±3°C and 60±10% RH using the modified Loschiavo food preference chamber. Preference was evaluated between red and white kolanuts, mature and immature kolanuts, and between stored and fresh kolanuts. Each experiment was replicated 4 times in a completely randomized design (CRD). T-distribution was used to test the differences in preference of the different food substances offered to the weevils. The result shows that 64.2% of the weevils were attracted to the fresh nuts and this was significantly ($p<0.05$) higher than the 35% weevils found in the cured nuts. There was no significant difference ($p>0.05$) in the distribution of the weevils in the red and white nuts, (53.15 and 46.9%) respectively. There was also no significant difference in the distribution of the weevils in mature and immature kolanuts (48.3% and 51.7%) respectively. This result clearly shows that the kolanut weevil <i>B. kolae</i> preferred fresh kolanuts to already cured and stored nuts. However, there is the need to further investigate the possibility of using fresh kolanuts to bait kola weevils in stored kolanuts as a component of an Integrated Pest Management (IPM) program for the control of weevils in storage.</p>	<p>Baskets Kola nuts Preference Storage Weevil</p>

Introduction

The cultivation of *Cola nitida* (Gbanja) started at Agege, just north of Lagos and spread from there into the rain forests within 150 km from this centre. Further development followed the course of the railway, which runs from Lagos via Abeokuta and Ibadan to Offa in Northern Nigeria. The gbanja kola can now be found cultivated throughout the forest area

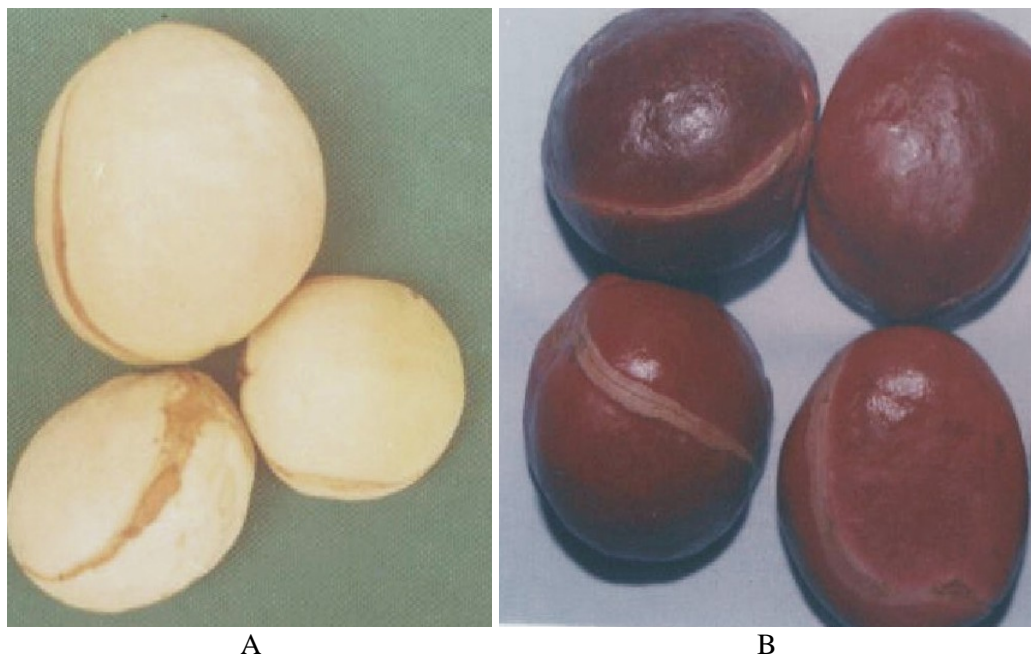
along this railway and penetrates into forest outliers, reaching out along streams and rivers into the Southern Guinea Savannah. Generally, the cultivation of kola in Nigeria is ecologically limited to the rain forest zones of the South and riverine areas of the Savannah region. Most of the kola produced in the country comes from Oyo, Ondo, Ogun and parts of Lagos states. In South-

eastern Nigeria, kola is mainly cultivated as a garden crop (Eijnatten, 1969; Daramola, 1978).

The kola trees usually bear nuts that are uniform in colour. The colour of the nuts can be red, pink or white. The commonest nut colour is red followed by pink, while white are rare. Some trees bear nuts of one colour, while others bear nuts of different colours

(Fig. 1). Even nuts within the same fruit may be of different colours and the proportion of nuts of the different colours can vary annually. The colour of the nuts, in addition to other parameters such as size, flavour and storage quality, determines the quality and price of nuts offered for sale in the market. The white nuts are the most highly prized probably by reason of the rarity (Eijnateen, 1969).

Fig. 1: *Cola nitida* - Healthy whole white (A) and red (B) nuts.



The cured nuts are sorted according to colour groups and sizes. They are then wrapped in green but partially dried leaves and stored in large baskets, kept in a shaded spot to await a favourable market. The leaves most frequently used are those of *Mitragyna* spp. locally known as “Abura or Obeche” (Hutchinson and Dalziel 1928). These leaves show great resistance to rotting and are sold under the trade name of “Gbago”. Banana leaves are occasionally used but they are partially dried and the midrib removed before use as banana wrapping often deteriorate rapidly and require frequent renewal. Other leaves used for the storage of kolanuts are obtained from various maranthaceous plants: *Thaumatococcus*, *Clinogyne*, *Dorax*, *Sarcophrynium* and *Maranthochloa* spp. (Chevalier and Perrot, 1911; Russell, 1955; Wills, 1962; Quarco, 1971).

The kolanut weevil *Balanogastriis kolae* (Desbr) (Coleoptera: Curculionidae) is the most destructive

pest of kolanuts in West Africa. (Daramola 1973, 1978) They attack the nuts from the field to storage. All the kola trees in Africa are believed to be infested (Alibert and Mallamire, 1955). The percentage infestation ranges from 30–100% depending on the sanitary condition on the farm and time of harvest (Famuyiwa, 1972; Daramola, 1973). The objective of this study therefore is to study the feeding preference of kolanut weevil (*Balanogastriis kolae*) (Coleoptera: Curculionidae) for different types of *Cola nitida* nuts.

Materials and methods

Observations on food preference were made under laboratory conditions of $27\pm 3^{\circ}\text{C}$ and $60\pm 10\%$ R.H. The fresh kola nuts obtained from kola trees at the Cocoa Research Institute of Nigeria (CRIN), Ibadan, were used for the studies. The fresh kola nuts were used 24 h after skinning and air-drying. The stored kola nuts used for the studies were two months old in

storage in thin-film black polythene bags with the mouth covered.

The feeding preference of the weevils was determined using the modified Loschiavo food preference chamber as described by (Loschiavo, 1952; Laudani and Swank, 1954) (Fig. 2). The chamber consisted of a circular platform 50 cm in diameter, with a 5 cm high metal rim. The platform was modified to have 12 circular chambers each 8.5 cm in diameter and 1.0 cm deep and spaced at equal distances apart along the perimeter of the platform. Plastic dishes (8 cm in diameter and 1 cm deep) were fitted in the chambers and the kola nut samples were placed in the plastic dishes. The rim of the platform was covered with a flat plastic plate. A small platform in the center served as a non-directional starting point for the insects.

Fig. 2: The Loschiavo food preference chamber.



Preference was evaluated between red and white kola nuts, mature and immature kola nuts, and between stored and fresh kola nuts. For each experiment, six cups were each filled with 5 kola nuts of the test materials and were arranged in alternate holes. Fifty (50) adult *Balanogastriis kolae* were introduced into the chamber. At the end of each exposure period of 24 h, the weevils in the cups were collected and counted to determine their distribution in the different test materials, which is attributed to their relative preference for the test materials. Each experiment was replicated 4 times in a completely randomized design (CRD). T-distribution was used to test the differences in preference of the different food substances offered to the weevils.

Results and discussion

Table 1 shows the distribution of kola weevils in kola nuts stored for 12 weeks and fresh kola nuts. The results show that 64.2% of the weevils were attracted to the fresh nuts and this was significantly ($p < 0.05$) higher than the 35% found in the cured nuts. There was no significant difference ($p > 0.05$) in the distribution of the weevils in the red and white nuts statistically (53.15 and 46.9%) respectively (Table 2). There was also no significant difference in the distribution of the weevils in mature and immature kola nuts (48.3% and 51.7 %) respectively (Table 3).

Table 1. The distribution of *Balanogastriis kolae* on stored and fresh kola nuts after a 24 h exposure in the food preference chamber.

Type of kola nuts	Mean	Percentage weevil distribution
Mature stored nuts	17.5	35.8
Mature Fresh nuts	31.5	64.2
Calculated t = 4.189; Observed t ($p = 0.05$) = 3.182.		

Table 2. The distribution of adult *Balanogastriis kolae* on red and white kola nuts after 24 h of exposure in the food preference chamber.

Type of kola nuts	Means	Range	Percentage weevil distribution
Red	25	19 - 29	53.1
White	22	19 - 27	46.9
Calculated t = 0.762; Observed t ($p = 0.05$) = 3.182 NS.			

Table 3. The distribution of *Balanogastriis kolae* on mature and immature kola nuts after 24 h of exposure in the food preference chamber.

Type of kola nuts	Mean	Percentage weevil distribution
Mature fresh nuts	20.00	47.6
Immature fresh nuts	22.00	52.4
Calculated t = 0.625; Observed t ($p = 0.05$) = 3.182 NS.		

The results on food preference studies showed that adult kola weevils were more attracted to fresh kola nuts than stored nuts. The results are in line with the findings of Ivbijaro (1976) that fresh kola nuts are more susceptible to weevil attack and adult weevils consumed a significantly higher amount of fresh nuts compared with aging nuts (2 to 6 months).

Conclusion

This result clearly shows that the kola nut weevil *B. kolae* preferred fresh kolanuts to already cured and stored nuts. However, there is the need to further investigate the possibility of using fresh kolanuts to bait kola weevils in stored kolanuts as a component of an Integrated Pest Management (IPM) program for the control of weevils in storage.

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