



Effect of consanguinity on production performance in modern pig farming in the Tonkpi Region, West of Côte d'Ivoire

**Bosson Nicolas ABOLY^{1*}, Kouakou Serge KOUADIO¹,
Kouhana SORO², Soronikpoho SORO¹
et Rodrigue V. Cao DIOGO³**

¹Institute of Agro-Pastoral Management (IGA), Peleforo GON COULIBALY University of Korhogo, Laboratory for Environment, Climate, Health, Engineering and Sustainable Development (LECI2D), Republic of Côte d'Ivoire, PO Box 1328, Korhogo.

²Biological Sciences Training Unit, Peleforo GON COULIBALY University of Korhogo, Republic of Côte d'Ivoire, PO Box 1328, Korhogo

³Department of Animal Production and Fisheries Sciences and Technology, Faculty of Agronomy, University of Parakou, Republic of Benin, PO Box 123, Parakou.

^{*} Corresponding author; Email: abolyb@gmail.com; Tel: (+225) 07 07 56 71 60

Manuscript History: Received: 5th September 2026; Revised: 20th September 2026;
Accepted: 30th September 2026, Published: 10th October 2026.

Abstract

A study was conducted in the Mountains District, in the west of Côte d'Ivoire, on in breeding in modern pig farming. Its overall objective was to determine the effects of consanguinity on pig production with a view to revitalizing the sector. To this end, a survey was carried out among 21 farms belonging to the cooperative society (SCOOPS-CEPOM). The results revealed that the number of piglets per litter per sow was 7.5 ± 1.68 . Meat pigs were weaned at an average of 251 ± 2.713 days, with an average live weight of 74.91 ± 6.904 kg. To reduce the cost of producing meat pigs, the farmers opted to produce farm-made feed for all stages of the pigs' growth on their farms. However, the mortality rate among the pigs was very high (30.34 ± 3.31 per cent) of from birth to sale. A comparison of the results revealed a highly significant difference ($p < 0.05$). However, the consequences of consanguinity could be avoided by changing the boar every year or every eighteen months and by purchasing new males or females from another farm to maintain good genetic diversity.

Keywords: Pig farming, consanguinity, mortality, SCOOPS-CEPOM, Côte d'Ivoire

Introduction

In Côte d'Ivoire, pig farming is booming as it is practiced almost everywhere. It is a profitable economic activity, provided that a number of factors are properly managed (MIRAH, 2022). Indeed, the pig sector recovered spontaneously following the eradication of African swine fever (ASF) in December 1996, driven by the initiative of national private operators (Coulibaly, 2013). The breeding stock used to restock pig farms at that time came from farms in the Mountains District, in the west of Côte d'Ivoire (MIRAH, 2012). This region has developed pig farming because the local population enjoys pork. Unfortunately, no sector of the economy escaped the ravages of the Ivorian crisis from 2002 to 2011. All production infrastructure, where not destroyed, has been severely damaged. The essential support from the public authorities for this initiative, which the farmers have been hoping for, has been slow in coming (Tra, 2009). This has been the root cause of many of the difficulties encountered by farmers in running their pig farms. However, there are plans to tackle the challenges facing pig production in the Tonkpi

Region by implementing a development strategy (SCOOPS-CEPOM, 2022). Although the pig sector has been revitalized, modern pig farming has been hampered by issues of consanguinity

Consequently, it seemed appropriate to ask whether this consanguinity might have a negative effect on the production performance of modern pig farms.

To test this research hypothesis, the aim of this study is to determine the effects of consanguinity on pig production with a view to revitalizing the sector.

1. Materials and Methods

1.1 – Study area

The study area is the Tonkpi Region, of which the city of Man is the regional capital, in the west of Côte d'Ivoire. The population of 1,387,909 is predominantly rural and engaged in agriculture (INS, 2021). The climate is equatorial, characterized by two dry seasons (a major dry season from November to March and a minor dry season from July to the end of August) and two rainy seasons (a major rainy season from March to June and a minor rainy season from September to October). The Tonkpi Region comprises five departments, namely Man, Biankouma, Danané, Sipilou and Zouan-Hounien. It is bordered to the east by the Guemon Region, to the west by Guinea and Liberia, to the north by the Bafing Region and to the south by the Cavally Region (Figure 1).

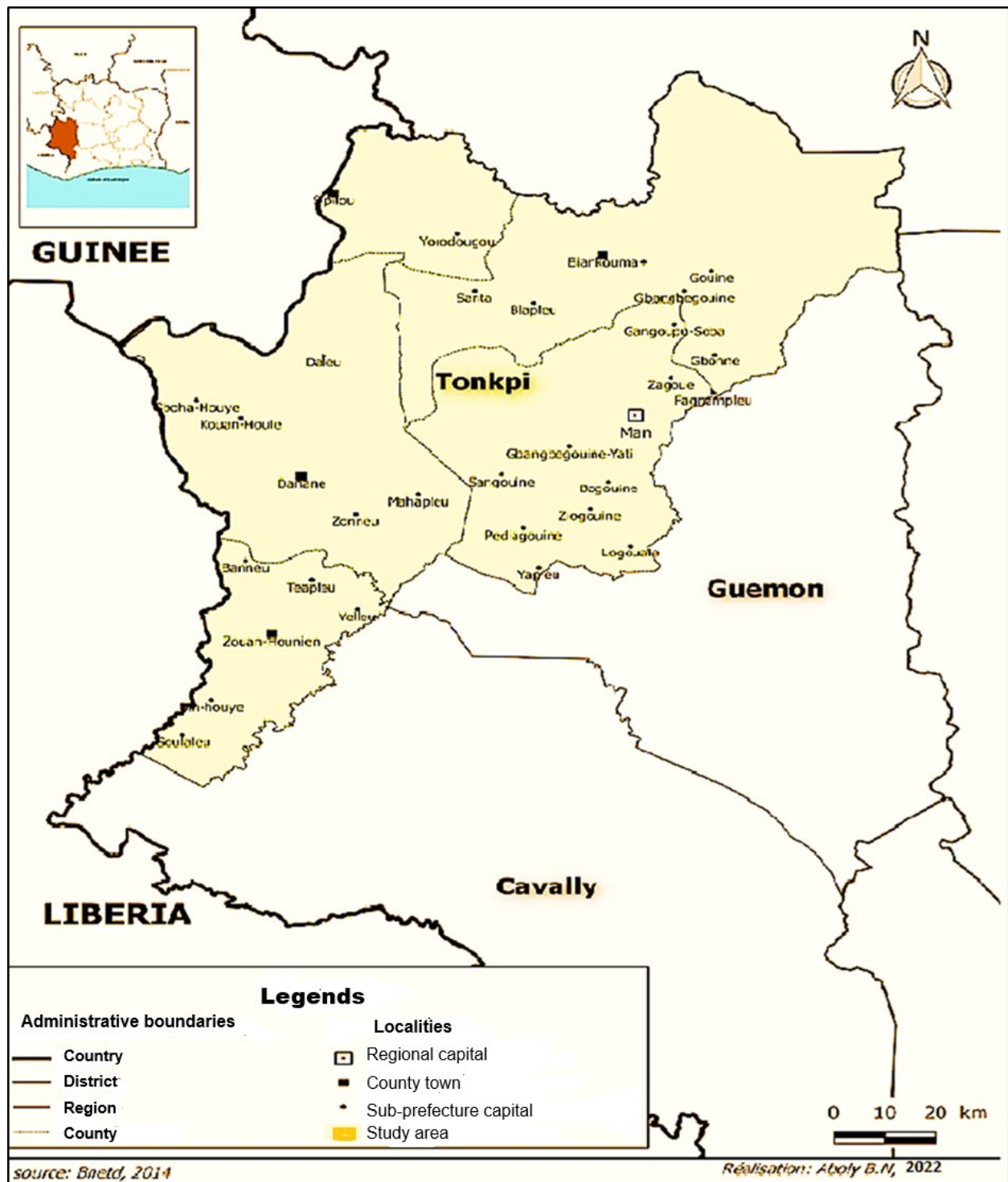


Figure 1: Map of the Tonkpi region showing the study area

1.2 – Sampling

For the purposes of sampling, the local co-operative (SCOOPS-CEPOM) had 71 members, of whom 32 were in the Tonkpi Region and 39 were based in other towns within the Mountains District. The cooperative's management selected 21 livestock farms on the basis of the farms' accessibility and the availability of the farmers. This represented 65.63% of the cooperative's active members.

1.3 – Data collection

A timetable for the conduct of the survey and data collection was drawn up. Initial contacts were made in the field to inform the various stakeholders concerned.

The survey took place from 15 January to 20 December 2025 and enabled the various production cycles for meat pigs to be observed on each farm. It was carried out through visits to pig farms, followed by interviews with the various stakeholders involved.

1.4- Pig farming practices

On the farms, breeding standards were adhered to, notably one boar for every 10 sows. The feed was the same for all pigs at the relevant age stages, whether breeding stock, fattening pigs or piglets. Health management was standardized, ranging from the administration of iron to piglets, internal and external deworming and various treatments as required. It should be noted that the majority of

breeding stock were crossbreeds resulting from farmers' unsystematic crossbreeding of different breeds such as Large White, Landrace and Pietrain.

1.5 – Analysis and processing of technical data

The data collected were analyzed and processed using Excel 2016. The aim was to calculate the average live weight in kg, the number of piglets per litter and the average production duration of meat pigs in days, as well as the average mortality rate per production cycle. Statistical analysis was carried out using SPSS Statistics 26, and comparisons of zootechnical parameters were performed using the Mann-Whitney U test at a 5% significance level.

2. Results

2.1 – Estimation of the number of piglets per sow and per litter

The average number of live-born piglets per sow and per litter was 7.50 ± 1.68 piglets. Most farms recorded an average of 8 to 10 piglets per litter. However, litters of fewer than 7 piglets per sow were also recorded (Table I).

The piglet mortality rate is high from birth to sale ($30.34 \pm 3.32\%$).

A comparison of the results relating to the number of piglets per sow across different farms revealed a highly significant difference ($p = 0.001$).

Table I: Average estimate of piglets per litter and mortality rate

Farms vis ited	Number of sows	Piglets born	Average number of piglets per litter per sow	Total number of pigs being fattened	Average mortality rate of pigs from birth to sale (%)
Aïssi Hyppolite	5	33	6,60±1.14	23	30,30±2.83
Amani Kouassi	7	48	6,86±1.95	39	18,75±2.12
Angbo Agnissan	5	40	6,5±2.37	32	20,00±3.00
Biaon Christophe	5	25	5,6±1.56	13	36,00±2.38
Camara Philippe	6	35	6,64±1.23	20	31,43±3.30
Coulibaly Issa	5	38	7,60±1.63	29	23,68±4.20
Coulibaly Gustave	7	59	8,43±0.84	45	23,73±3.95
Douanée	5	32	6,63±2.0	25	21,88±4.69
Ezintogon	3	21	7,00±2.37	12	42,86±4.57
Gla Germain	3	31	10,33±2.27	17	41,94±3.56
Gomonan Doué	5	40	8,14±2.40	29	32,50±3.32
Guedé Bambade	2	17	8,5±1.23	9	41,18±2.45
Gueu Pascal	3	25	8,33±1.10	17	32,00±2.06
Gvc Koiwon	4	31	7,75±1.40	23	25,81±1.50
Hounsey Théophile	7	48	6,86±2.20	38	20,83±2.65
Houphouët Mathieu	4	31	7,71±1.50	15	38,71±2.16
Kapeu Touamin	3	23	7,67±1.53	15	34,78±3.51
Kéké Privat	7	54	7,71±1.80	35	35,19±3.30
Kessé Gbe	5	47	9,40±1.10	34	27,66±4.03
Mommy Gondo	5	33	6,60±2.10	22	33,33±3.70
Tia Paul	11	73	6,64±1.70	55	24,66±5.19
General average			7.5±1.68	26.05± 11.92	30.34±3.32
p-value			0.001	0.001	0.001

2.2 – Estimation of the average live weight and production cycle duration of pigs for meat

Pigs for meat are produced on average at 251 ±2.71 days, with an average live weight of 74.91±6.90 kg. It should be noted that the minimum production cycle duration for pigs for

meat is 213 days and the maximum is 312 days. Such a production cycle does not allow farmers to complete two cycles in a year (Table II). A comparison of results between farms regarding live weight and the duration of the production cycle for fattening pigs revealed a highly significant difference (p=0.001).

Table II: Average live weight and production period of pigs for meat production

Farms visited	Production period for meat pigs in days	Live weight of pigs for meat production in kg
Aïssi Hyppolite	257±7.04	73.65±9.35
Amani Kouassi	279±3.27	81.09±7.53
Angbo Agnissan	229±1.0	77.00±7.10
Biaon Christophe	241±1.87	76.00±6.55
Camara Philippe	271±2.97	77.35±6.92
Coulibaly Issa	299±1.00	77.24±6.92
Coulibaly Gustave	246±2.89	73.12±8.36
Douanée	241±6.48	68.67±6.27
Ezintogon	214±1.00	77.35±6.75
Gla Germain	248±2.00	75.58±6.65
Gomonan Doué	210±3.08	68.69±7.29
Guedé Bambade	250±1.00	70.44±3.64
Gueu Pascal	281±3.00	76.76±5.31
Gvc Koiwon	247±0.82	71.22±6.76
Hounsey Théophile	275±1.53	76.44±7.23
Houphouët Mathieu	241±0.82	74.93±5.65
Kapeu Touamin	213±1.00	72.53±7.23
Kéké Privat	216±4.12	76.16±8.63
Kessé Gbe	251±1.87	75.95±6.53
Mommy Gondo	258±6.13	76.42±7.11
Tia Paul	312±6.10	76.42±7.14
General average	251±2.71	74.91±6.90
p-value	0.001	0.001

2.3 – Pig feed

Pig farmers use two types of pig feed: commercially available complete feed and feed produced by co-operatives for their members.

Given the popularity of farm-produced feed, the co-operatives have resolved to produce feed

tailored to the pigs' physiological stage. The aim was to comply with current standards whilst making use of raw materials available locally or regionally. In the feed composition, maize and wheat bran accounted for between 25 and 62% of a 50 kg bag of feed for piglets, pregnant sows and lactating sows (Table III).

Table III: Composition of pig feed by physiological stage

Type of food	Composition of pig feed									
	Pregnant and lactating		Piglets				Fattening Pigs		Boars	
	sows		First age		Second age					
	Feed (kg)	Composition (%)	Feed (kg)	Composition (%)	Feed (kg)	Composition (%)	Feed (kg)	Composition (%)	Feed (kg)	Composition (%)
Maize bran	21	42	31	62	31	62	21	42	10.75	21.5
Wheat bran	12.5	25	3.5	7	3.5	7	10	20	14.5	29
Salt	0.25	0.50	0.15	0.30	0.15	0.30	0.25	0.50	0.25	0.5
Fish	6	12	4	8	4	8	3	6	8.5	17
Soya	5.5	11	8	16	8	16	15	30	6	12
Shellfish or phosphate	1,5	3	1	2	1	2	×	×	×	×
Iron	0.125	0.25	×	×	×	×	×	×	×	×
Choline	0.125	0,25	×	×	×	×	×	×	×	×
Concentrate	0.25	0.50	1.1	2.2	1.1	2.2	0.75	1.5	×	×
Total	50	100	50	100	50	100	50	100	50	100

x: Feed ingredients not included in pig feed formulations

3. Discussion

The pig sector has performed well, with production rising from 8,583 TEC in 2014 to 11,620 TEC in 2019 – an increase of around 35 per cent – and a total herd (modern and traditional) of 431,389 head in 2019. Breeding stock for the restocking of pig farms in Côte d'Ivoire came from farms in the Mountains District following the outbreak of African swine fever in 1996 (MIRAH, 2022). Indeed, this region has developed pig farming because the population enjoys pork (MIRAH, 2012). However, modern pig farming has faced problems of consanguinity. An average of 6 to 10 piglets per litter was observed, with a mean of 7.5 ± 1.68 piglets. This could be explained by the fact that breeding stock often come from the same farms, which encourages inbreeding, particularly as farmers are unaware of kinship links (Dotché et al., 2018).

The same findings were reported in Madagascar, and these led to a decline in yield rather than an improvement (Benoît and Capo-Chich, 2015). Meat pigs were reared to market on average at 251 ± 2.71 days, with an average live weight of 74.91 ± 6.90 kg. A comparison of results from a single farm revealed a highly significant difference ($p < 0.05$). Such a production system does not allow farmers to complete two production cycles in a year. According to Houndonougbo et al. (2012), for breeding purposes, some farmers borrow boars from their neighbors, and the same boars are used by several pig farms. It turns out that small-scale farms had a high rate of inbreeding. This consanguinity led to a decline in reproductive performance and stunted growth (Kiendrebeogo, 2010). According to Herrero-Medrano (2013), inbreeding reduces performance, particularly litter size, piglet weight, age at puberty and boar libido.

To reduce the cost of producing pigs for meat, the majority of farmers have opted to produce farm-made feed for all stages of the pigs' development on their farms (Klooster and Wingelaar, 2011).

Unfortunately, the piglet mortality rate was very high ($30.34 \pm 3.31\%$). According to Saura et al. (2015), the consequences of consanguinity include high mortality at birth and between birth and weaning, weak piglets at birth, slow growth rates, smaller litter sizes and high abortion rates. Therefore, to avoid inbreeding, it is essential to change the boar – in particular, to replace him every year or every eighteen months – so that he does not mate with his own daughters. Furthermore, purchasing new males or females from another farm will help to maintain good genetic diversity.

Conclusion

The Mountains District has developed modern pig farming, and its management has faced problems of consanguinity. At the conclusion of the study, the results showed that the number of piglets per litter per sow was 7.5 ± 1.68 . Fattening pigs were weaned at an average of 251 ± 2.71 days, with an average live weight of 74.91 ± 6.90 kg. To reduce the cost of producing fattening pigs, farmers decided to feed the pigs with farm-produced feed at all stages of their growth. However, the mortality rate among the pigs was very high (30.34 ± 3.31 per cent) from birth to sale. A comparison of the results revealed a highly significant difference ($p < 0.05$). Nevertheless, the consequences of consanguinity could be avoided by changing the boar every year or every eighteen months and by purchasing new males or females from another farm to maintain good genetic diversity.

Acknowledgments

The authors would like to thank the Director of the Man Cooperative Society (SCOOPS-CEPOM) and his colleagues, as well as the anonymous reviewers, for their contributions.

Declaration of authors' contributions

The study and the drafting of the manuscript were carried out collaboratively. However, as detailed below, BNA, SS, KSK and SK were involved in the design and planning of the study. KSK, SK and SS collected the data and drafted the first version of the manuscript. RVCD, SS and SK carried out the statistical analyses and interpreted the data. RVCD, BNA and SS undertook a critical review of the manuscript.

Opinion of the ethics committee

This manuscript does not contain any clinical studies or patient data. Consequently, the opinion of the ethics committee was not required.

Conflicts of interest

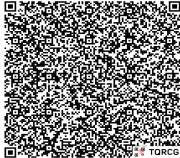
The study was conducted without any conflicts of interest.

References

- Benoît T. and Capo-Chichi M. 2015. L'élevage Porcin Dans la Région d'Analajirofo à Madagascar. Copyr, CIRAD, France. 19p
- Djiakariya Coulibaly 2013. Politique de développement de l'élevage en Côte d'Ivoire. Direction de la planification et des programmes. Abidjan. 31 p.
- Dotché, I.O., Ahounou, G.S., Salifou, C.F.A., Biobou, R., Kiki, P., Govoeyi, B., Antoine-Moussiaux, N., Dehoux, J.P., Mensah, A., Farougou, S., Thilmant, P., Youssao, A.K.I. and Koutinhoun, B. 2018. Critères de choix et de réforme des reproducteurs mâles et femelles dans les élevages de porcs des départements de l'Ouémé et du Plateau au Bénin. *Rev. Elev. Med. Vet. Pays Trop.* 71(1-2): 47-57.
- Herrero-Medrano J.M., Megens H.J., Crooijmans R.P., Abellaneda J.M. and Ramis G. 2013. Farm-by-farm analysis of microsatellite, mtDNA and SNP genotype data reveals inbreeding and crossbreeding as threats to the survival of a native Spanish pig breed. *Anim. Genet.* 4(3): 259-266.
- Houndonougbo, M.F., Adjolohoun, S., Aboh, B.A., Singbo, A. and Chrysostome, C.A.A. 2012. Caractéristiques du système d'élevage porcin au Sud-Est du Bénin. *Bull. Rech. Agron. Bénin, Numéro Spécial Élevage & Faune.* pp.15-21.
- INS, 2021. Estimation de la population du District des Montagnes. Institut Nationale de la Statistique (INS). Man. 17p.
- Johan Van't Klooster, Arie Wingelaar, 2011. L'élevage des porcs dans les zones tropicales. Série Agrodok n°1, fondation Agromisa et CTA, Wageningen. Pays-Bas, 109p.
- Kiendrebeogo T., Logtene Y.M., Kondombo S. and Kabore-Zoungrana C. 2010. Characterization and importance of pig breeds in the pork industry of the BoboDioulasso zone (Burkina Faso, West Africa). *Adv. Anim. Biosci.* 6(4): 1535-1547.
- MIRAH (Ministère des Ressources Animales et Halieutiques), 2012. Vision de développement et orientations stratégiques in Plan National de Développement. République de Côte d'Ivoire, Abidjan. 132 p.
- MIRAH (Ministère des Ressources Animales et Halieutiques), 2022. Politique nationale de développement de l'élevage, de la pêche et de l'aquaculture (PONADEPA 2022-2026). Ministère des Ressources Animales et Halieutiques, Côte d'Ivoire. 178 p
- Saura M., Fernández A., Varona, L., Fernández A.I., De Cara M.Á.R., Barragán C. and Villanueva B. 2015. Detecting inbreeding depression for reproductive traits in Iberian pigs using genome-wide data. *Genet. Sel. Evol.* 47(1): 1-7

SCOOPS-CEPOM, 2022. Production porcine dans le District des Montagnes : Historique. Société Coopérative des Eleveurs de Porcs de l'Ouest Montagneux (SCOOPS-CEPOM).Man, 13p.

Tra B. T. C., 2009. Filière porcine en Côte d'Ivoire: Production, proposition d'amélioration et perspectives de développement. Thèse de Doctorat, Université Cheik Anta Diop de Dakar. Sénégal. 96p.

Access this Article in Online	
	Website: www.ijarbs.com
	Subject: Animal Farming
Quick Response Code	
DOI: 10.22192/ijarbs.2026.13.10.002	

How to cite this article:

Bosson Nicolas ABOLY, Kouakou Serge KOUADIO, Kouhana SORO, Soronikpoho SORO, et Rodrigue V. Cao DIOGO. (2026). Effect of consanguinity on production performance in modern pig farming in the Tonkpi Region, West of Côte d'Ivoire. Int. J. Adv. Res. Biol. Sci. 13(10): 13-22. DOI: <http://dx.doi.org/10.22192/ijarbs.2026.13.10.002>