Original Research Article

Knowledge state of two endemic varieties of *Dioscorea cayenensis-rotunda*ta with yellow flesh ("Kounougbé" and "Kangba") cultivated in the Gbêkê region and the level of chemical weeding use

ABSTRACT

Background: Yam is the main staple food in Côte d'Ivoire and plays a crucial role in food security. However, indigenous yellow-fleshed varieties of the *Dioscorea cayenensis-rotundata* species, such as "Kounougbé" and "Kangba", are gradually being abandoned in favor of modern varieties.
Study Design: A study was conducted in the departments of Bouaké, Béoumi, Sakassou, and Botro, in the Gbêkê region, to assess the knowledge of these varieties, the preference for their tubers, and the use of chemical weeding.
Results: The chi-square (χ^2)test of independence showed that variables gender, age range, ethnic group and educational levels influence significantly ($p<0.05$) the knowledge level of "Kounougbé" and "Kangba" varieties. This knowledge level is relatively high in the different departments. The study revealed that uneducated people have better knowledge (83.97%) of these varieties. It also indicated that people aged at least 55 years old have a very good knowledge of these varieties. Moreover, the servey revealed that the natives are more familiar with "Kounougbé" and "Kangba" varieties with a rate of 92.68%. Concerning the characteristics preference of said varieties tubers and chemical weeding use, they impact meaningfully ($p<0.05$) the age range variable. People at least 55 years old have the highest preference and use of chemical weeding levels with respective rates of 98.61% and 41.46%.
Conclusion: This study constitutes a source of basic data which would contribute to the revaluation of endemic varieties of yellow-fleshed yam

Keywords: D. cayenensis-rotundata, variety, level of knowledge, level of preference, chemical weeding

1. INTRODUCTION

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Yams (*Dioscorea* spp.) are tuberous herbaceous plants. They belong to the genus *Dioscorea*, which includes more than 600 species distributed across the tropical and temperate regions of Asia, Africa, and the Americas [1]. In Africa, yam cultivation extends from Cameroon to Guinea [2]. In West and Central Africa, the five species commonly found are the *Dioscorea cayenensis-rotundata* complex, *Dioscorea dumetorum*, *Dioscorea alata*, *Dioscorea esculenta*, and *Dioscorea bulbifera*. The numerous varieties of the *Dioscorea cayenensis-rotundata* complex and *Dioscorea alata* dominate yam cultivation. Their tubers

form the staple food for more than 155 million people worldwide [3]. In Côte d'Ivoire, due to dietary traditions, yams play a crucial role, despite the extensive cultivation of cassava, bananas, plantains, and rice [4]. Among food crops, in terms of production, yams rank first ahead of cassava (6,300,000 tons/year) and bananas and plantains (2,113,309 tons/year) [5]. Due to its significant role in food security, ritual ceremonies, and the improvement of producers' income, yams are considered a species whose promotion is necessary. Additionally, the demand for yams has seen a significant increase, partly due to rapid urbanization [6]. Despite this, there has been a lethargy in the yam sector's activities and relatively constant production in recent years. Also, yellow-fleshed endemic varieties adapted to local conditions are gradually being abandoned in favor of modern varieties. According to [7], the flesh color of yams is an important preference criterion. Its determination is due to the presence of pigments, mainly carotenoids and glucosides, with anthocyanins being the most common. The pigments found in the yellow-fleshed varieties of *D. cayenensis-rotundata* are largely carotenoids [8]. These pigments have antioxidant properties. Moreover, these tubers could help address vitamin A deficiency issues. To address concerns related to the abandonment of yellow-fleshed endemic varieties, a sociodemographic study on the knowledge of these varieties and cultural practices is necessary to understand the stakeholders in the yam sector. This study aims to assess the levels of knowledge and preference for the tubers of traditional yellow-fleshed yam varieties and the level of chemical weeding use in the Gbêkê region.

2. MATERIAL AND METHODS

Plant material

The study focused on the tubers of *Dioscorea cayenensis-rotundata* varieties ("Kounougbé", "Kangba") harvested in the Gbêkê region (Fig. 1).

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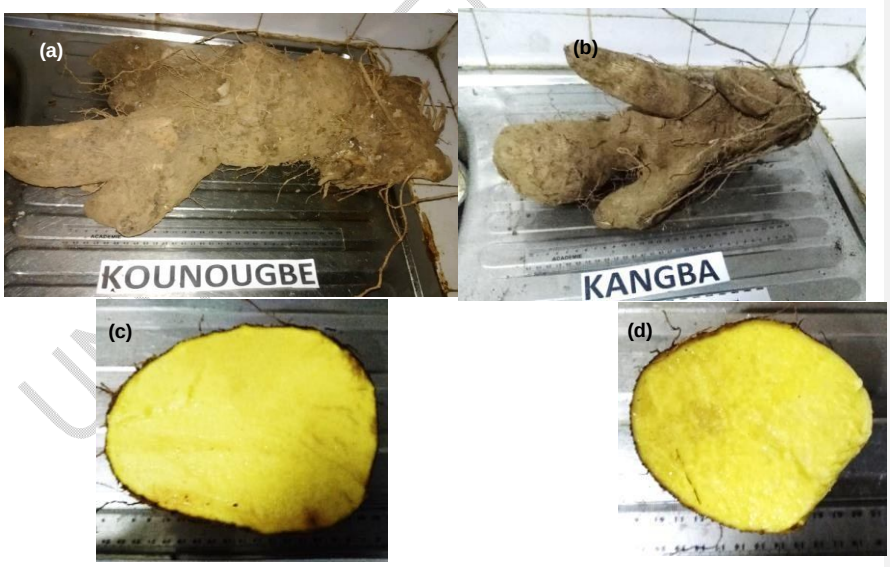

Fig. 1.Tubers of *Dioscorea cayenensis-rotundata*, var* "Kounougbé" (a) and "Kangba" (b), and cross-sections of *Dioscorea cayenensis-rotundata*, var "Kounougbé" (c) and "Kangba" (d)

Legend: a) Whole tuber of *Dioscorea cayenensis-rotundata*, var "Kounougbé"; b) Whole tuber of *Dioscorea cayenensis-rotundata*, var. "Kangba"; c) Cross-section of *Dioscorea cayenensis-rotundata*, var. "Kounougbé"; d) Cross-section of *Dioscorea cayenensis-rotundata*, var "Kangba".
*Variety

Methods

Study site

The study was conducted in the central-north region of Côte d'Ivoire, in the Gbêkê region, which comprises four (04) departments (Bouaké, Béoumi, Sakassou, and Botro) and includes a total of 771 villages spread across 20 sub-prefectures (Fig. 2). It is located between latitudes 7°30'N and 8°30'N and longitudes 4°30'W and 5°30'W. The Gbêkê region is bordered by the Hambol region to the north, the Béré region to the south, the N'zi region to the southwest, the Moronou region to the east, and the Bélier region to the west. According to the INS in 2022, the latest general census of population and housing in 2021 estimated the population of the Gbêkê region at 1,352,900 peoples.

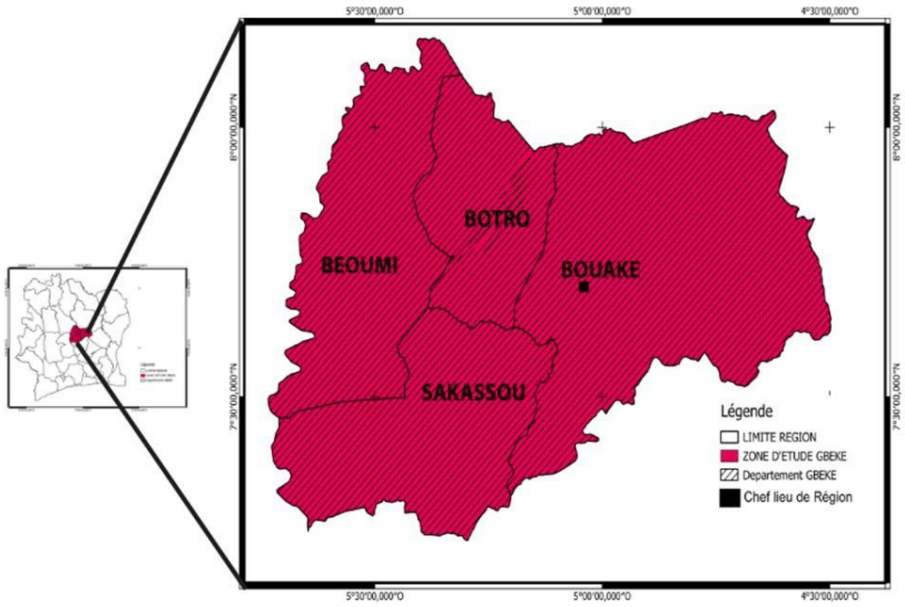

Fig. 2.Geographical location of the study area (Bouaké, Béoumi, Sakassou, and Botro Departments)
Legend: In red, study area (GBEKE region). In black, regional capital (Bouaké). Black line, regional boundary. Hatched area, different departments within the GBEKE region.

Sample size

The sample size was calculated using [9] formula:

$$N=\frac{\square^{\square}\times\square(\square-\square)}{\square^{\square}}$$

(1)

Where:
N: required sample size
z: 1.96 at a 95% confidence level
m: margin of error (set at 4.38%)
p: estimated proportion of the population familiar with yam cultivation (p being unknown, p = 0.5 is used).
The minimum sample size obtained, on which the survey was based, was 504 individuals. This number was evenly distributed with 126 respondents per department.

Survey procedure

Surveys were conducted using two survey forms during the period from October 2021 to December 2021. The first form was intended exclusively for farmers, and the second for regular yam consumers. These survey forms were filled out following semi-structured individual or group interviews (focus groups) in the selected localities. The respondents were met in various locations (fields, markets, households, streets, bus stations, etc.) and were chosen among men and women aged at least 15 years. The questionnaire focused on the knowledge of yellow-fleshed yam varieties, their preference, and the use of chemical weeding. The sociodemographic characteristics of the respondents were also considered.

Analysis of survey Data

Determination of knowledge level (KL)

The knowledge level was obtained by the ratio of the number of individuals familiar with yellow-fleshed yam varieties to the total number of individuals surveyed (Nt) according to the following mathematical formula:

KL (%) = $\frac{\square}{\square} \times \square\square\square$ **(2)**

Determination of usage rate (UR)

The usage rate was determined by the ratio of the number of individuals using chemical weeding (U) to the total number of individuals surveyed (Nt) according to the following mathematical expression:

UR (%) = $\frac{\square}{\square} \times \square\square\square$ **(3)**

Determination of preference rate (PR)

The preference percentage was calculated by the ratio of the number of people preferring yellow-fleshed yam varieties to the total number of people surveyed (Nt) according to the following equation:

PR (%) = $\frac{\square}{\square} \times \square\square\square$ **(4)**

Statistical analyses

The Sphinx Plus2 (V5) and SPSS 22.0 software were used respectively for data entry and processing. The Chi-square (χ^2) independence test was used to study the relationship

between categorical variables (Department, Age Group, Gender, Education Level, and Ethnicity) on dichotomous variables (Knowledge Level, Preference, and Use of Chemical Weeding). Additionally, the comparison between knowledge levels and between chemical weeding usage levels relative to each categorical variable was performed using the Chi-square test followed by the Marascuilo procedure using XLSTAT version 2014 software. The significance level for all statistical tests was set at p = 0.05.

3. RESULTS

Sociodemographic characteristics of consumers

The sociodemographic characteristics of the respondents included department, gender, ethnic group, age, and education level (Table 1). Women were the most numerous with a total of 305, representing 60.52% of the respondents. The department of Béoumi had the largest number of women with 85 individuals. Regarding age groups, people aged between 35 and 44 years were the most numerous in the departments, except for the Bouaké department, with a total of 130, or 25.80% of those surveyed. Concerning the ethnic group of the respondents, a predominance of natives was observed across all departments, with a total of 324 individuals representing 64.29% of the respondents. As for education level, illiterate individuals were the most numerous, with a rate of 47.03%.

Table 1.Sociodemographic characteristics of the respondents

Variables	Study Areas (Departments)					
	Bouaké	Béoumi	Sakassou	Botro	Total	%
Gender						
Male	53	41	47	58	199	39.48
Female	73	85	79	68	305	60.52
Age Range						
[15-25[	18	19	20	25	82	16.27
[25-35[	38	33	28	25	124	24.60
[35-45[	28	36	29	37	130	25.80
[45-55[	25	18	26	27	96	19.04
≥50	17	20	23	12	72	14.29
Ethnic Group						
Indigenous	82	100	70	72	324	64.29
Ivorianallochthones	37	20	41	41	139	27.58
Non-Ivorianallochthones	7	6	15	13	41	8.13
Education Level						
Illiterate	55	67	63	52	237	47.03
Primary	40	39	54	53	186	36.90
Secondary	26	16	6	15	63	12.50
Higher	5	4	3	6	18	3.57

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Sociodemographic characteristics of producers

The sociodemographic characteristics of the respondents were analyzed based on department, gender, age group, ethnic group, and education level (Table 2). Regarding gender, men were more numerous than women in all departments. For the age group, the highest proportion of respondents belonged to the 45-55 age group, followed by the 35-44 age group, across all departments. As for the ethnic group, there is a predominance of indigenous people in all departments, with 69% of respondents. Regarding the education level, illiterates were predominantly represented in all departments, except in Botro, where those with a primary education level had the highest number.

Table 2. Sociodemographic characteristics of interviewed producers

Variables	Study Areas (Departments)					
	Bouaké	**Béoumi**	**Sakassou**	**Botro**	**Total**	**%**
Gender						
Male	22	22	21	22	87	87.00
Female	3	3	4	3	13	13.00
Age Range						
[15-25[	3	2	1	3	9	9.00
[25-35[	1	4	6	4	15	15.00
[35-45[	2	3	6	7	18	18.00
[45-55[	11	12	9	9	41	41.00
≥50	8	4	3	2	17	17.00
Ethnic Group						
Indigenous	18	13	17	21	69	69.00
Ivorian allochthones	5	9	5	3	22	22.00
Non-Ivorian allochthones	2	3	3	1	9	9.00
Education Level						
Illiterate	16	13	18	11	58	58.00
Primary	8	12	6	12	38	38.00
Secondary	1	0	1	2	4	4.00
Higher	0	0	0	0	0	0

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Knowledge level of yellow-fleshed yam varieties

Distribution of knowledge level of yellow-fleshed yam varieties by department The knowledge level of yellow-fleshed yam varieties among the surveyed populations varies from one department to another (Fig. 3). The highest level of knowledge was observed in the Sakassou department, with a rate of 83.33%. Additionally, statistical analysis using the Chi-square test showed that the observed Chi-square value ($\chi^2_{obs}=4.56$) is lower than the theoretical Chi-square value ($\chi^2_{théo}=7.81$). Therefore, there is no significant association between the level of knowledge of yellow-fleshed yam varieties and the department. Furthermore, the Chi-square homogeneity test indicated that there aren't significant differences ($p > 0.05$) between the levels of knowledge of yellow-fleshed yam varieties across the different departments.

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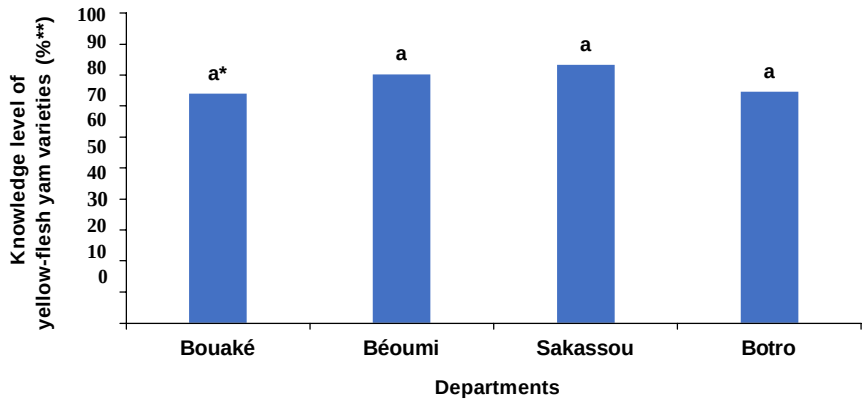

Fig. 3. Knowledge level of yellow-flesh yam varieties by department
*[Common letters indicate that there aren't significant differences (p > 0.05) according to the Chi-square test for homogeneity].
**Percentage

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Distribution of knowledge level of yellow-fleshed yam varieties by gender

The knowledge level of yellow-fleshed yam varieties differs by gender (Fig. 4). Women have a higher level of knowledge (84.92%) compared to men (67.34%). The Chi-square independence test revealed that the observed Chi-square value (χ^2_{obs} = 21.67) is greater than the theoretical Chi-square value ($\chi^2_{théo}$ = 3.84). There is therefore a significant association between gender and the knowledge level of yellow-fleshed yam varieties. Moreover, the Chi-square homogeneity test revealed significant differences ($p < 0.05$) between the knowledge levels of women and men regarding yellow-fleshed yam varieties.

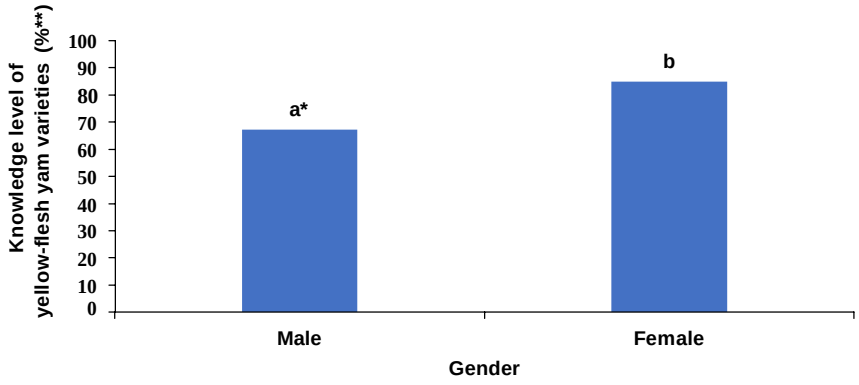

Fig. 4.Knowledge level of yellow-flesh yam varieties by gender

*[Different letters indicate that there are significant differences (p<0.05) according to the Marascuilo procedure].
**Percentage

Distribution of knowledge level of yellow-fleshed yam varieties by age group

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The knowledge level of yellow-fleshed yam varieties varies by age group (Fig. 5). Individuals aged 55 and above have the highest level of knowledge (100%), while the lowest level of knowledge (71.77%) was observed in the 25-35 age group. The Chi-square independence test indicated that the observed Chi-square value (χ2obs = 178.93) is higher than the theoretical Chi-square value (χ2théo = 9.48). Thus, there is a significant association between the age group and the knowledge level of yellow-fleshed yam varieties. Additionally, the Chi-square homogeneity test showed at least one significant difference (p < 0.05) between the knowledge levels of yellow-fleshed yam varieties across different age groups. The Marascuilo procedure revealed significant differences (p < 0.05) between the knowledge levels of the [15-25[and [25-35[age groups and those of the [35-45[, [45-55[, and ≥55 age groups.

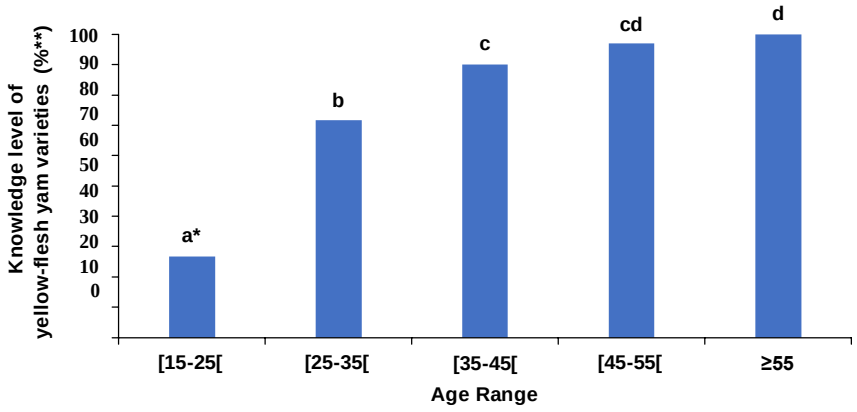

Fig. 5.Knowledge level of yellow-flesh yam varieties by age group
*[Different letters indicate that there are significant differences (p<0.05) according to the Marascuilo procedure].
**Percentage

Distribution of knowledge level of yellow-fleshed yam varieties by ethnic group The knowledge level of yellow-fleshed yam varieties varies across ethnic groups (Fig. 6). Indigenous respondents had the highest level of knowledge (92.68%), while the lowest level (74.10%) was observed among non-Ivorian allochthones respondents. Furthermore, the Chi-square independence test showed that the observed Chi-square value (χ2obs = 6.38) is higher than the theoretical Chi-square value (χ2théo = 5.99). Therefore, there is a significant association between ethnic group and the knowledge level of yellow-fleshed yam varieties. Additionally, the Chi-square homogeneity test indicated at least one significant difference (p < 0.05) between the knowledge levels of yellow-fleshed yam varieties among different ethnic groups. The Marascuilo procedure revealed a significant difference (p < 0.05) between the knowledge levels of indigenous groups and those of Ivorian allochthones and non-Ivorian allochthones groups.

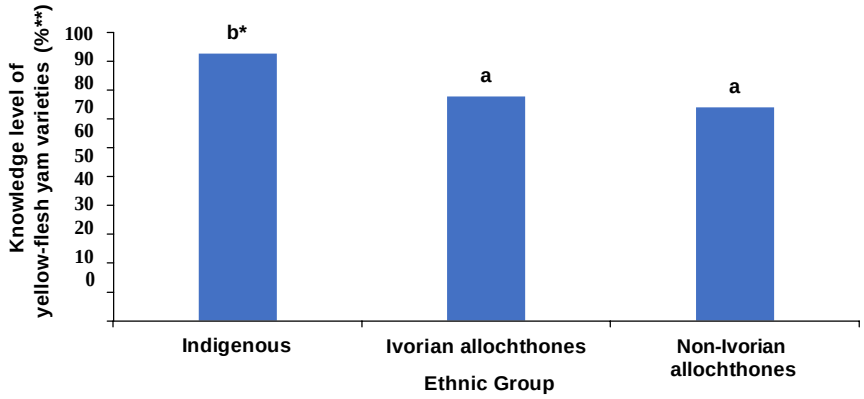

Fig. 6.Knowledge level of yellow-flesh yam varieties by ethnic group
*[Different letters indicate that there are significant differences ($p<0.05$) according to the Marascuilo procedure].
**Percentage

Distribution of knowledge level of yellow-fleshed yam varieties by education level

The knowledge level of yellow-fleshed yam varieties varies by education level (Fig. 7). Illiterate individuals have the highest level of knowledge, followed by those with primary and secondary education levels, with respective rates of 83.97% and 78.49%. Moreover, the Chi-square independence test revealed that the observed Chi-square value ($\chi 2obs= 22.65$) is higher than the theoretical Chi-square value ($\chi 2théo = 7.81$). Thus, there is a significant association between education level and the knowledge level of yellow-fleshed yam varieties. The Chi-square homogeneity test showed a significant difference ($p < 0.05$) between the knowledge levels of yellow-fleshed yam varieties among respondents with different education levels. The Marascuilo procedure revealed a significant difference ($p < 0.05$) between the knowledge levels of yellow-fleshed yam varieties among illiterate individuals and those with higher education levels.

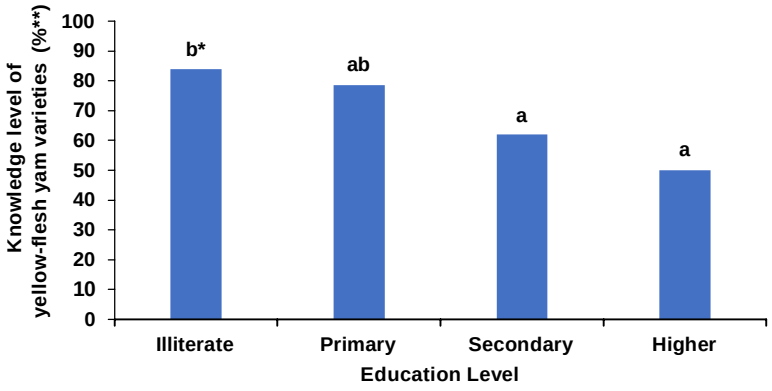

Fig. 7.knowledge level of yellow-flesh yam varieties by education level
*[Different letters indicate that there are significant differences ($p<0.05$) according to the Marascuilo procedure].
**Percentage

Preference for yellow-fleshed yam varieties

Preference for yellow-fleshed yam varieties by department

The preference for yellow-fleshed yam varieties varies from one department to another (Fig. 8). The highest preference for yellow-fleshed yam varieties (94.68%) is observed in the Botro department. Statistical analysis of the Chi-square test showed that the observed Chi-square value ($\chi^2\_obs = 2.08$) is lower than the theoretical Chi-square value ($\chi^2\_théo = 7.81$). There is thus independence between the characteristics and preferences for yellow-fleshed yam varieties and the department. Additionally, the Chi-square homogeneity test indicated that there aren't significant differences ($p > 0.05$) between the preferences for yellow-fleshed yam varieties across different departments.

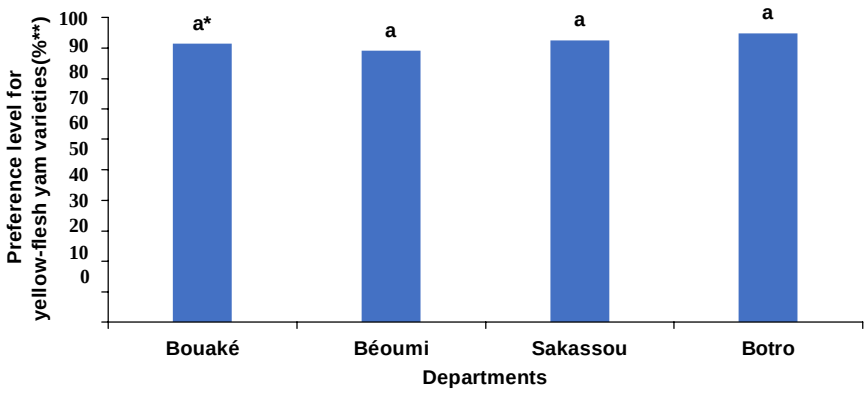

Fig. 8.Preference level for yellow-flesh yam varieties by department
*[Common letters indicate that there aren't significant differences ($p > 0.05$) according to the Chi-square test for homogeneity].
**Percentage

Preference for yellow-fleshed yam varieties by gender

Preference for yellow-fleshed yam varieties differs by gender (Fig. 9). Women had the highest preference for yellow-fleshed yam varieties with 93.05% of respondents. Furthermore, the Chi-square independence test showed that the observed Chi-square value ($\chi^2\_obs = 1.44$) is lower than the theoretical Chi-square value ($\chi^2\_théo = 3.84$). There is no link between the categorical variables of preference for yellow-fleshed yam varieties and gender. Moreover, the Chi-square homogeneity test indicated that there aren't significant differences ($p > 0.05$) between the preferences for yellow-fleshed yam varieties between men and women.

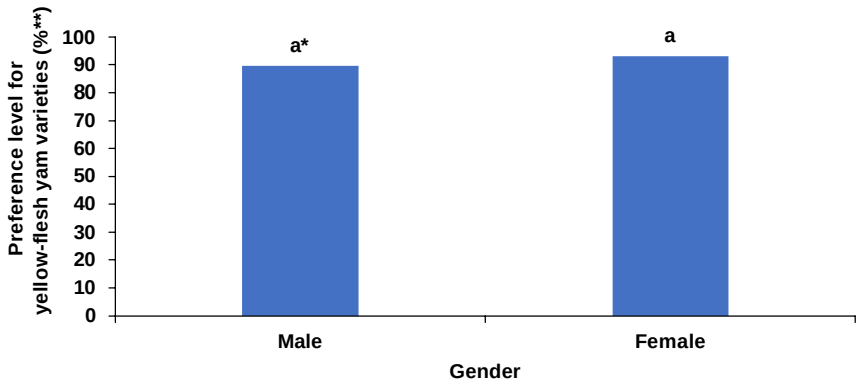

Fig. 9.Preference level for yellow-flesh yam varieties by gender
*[Common letters indicate that there aren't significant differences (p > 0.05) according to the Chi-square test for homogeneity].
**Percentage

Preference for yellow-fleshed yam varieties by age group

Preference for yellow-fleshed yam varieties varies by age group (Fig. 10). People aged 55 and over have a strong preference for yellow-fleshed yam varieties (98.61%), followed by the [45-55[and [35-45[age groups with proportions of 95.70% and 91.45%, respectively. The Chi-square independence test indicated that the observed Chi-square value (χ^2_obs = 14.18) is higher than the theoretical Chi-square value (χ^2_théo = 9.48). There is a link between the variables of preference for yellow-fleshed yam varieties and age group. Additionally, the Chi-square homogeneity test revealed that there is at least one significant difference ($p < 0.05$) between the preference for yellow-fleshed yam varieties across different age groups. The Marascuilo procedure showed only one significant difference ($p < 0.05$) between the preference for yellow-fleshed yam varieties among the [25-35[age group and the ≥55 age group.

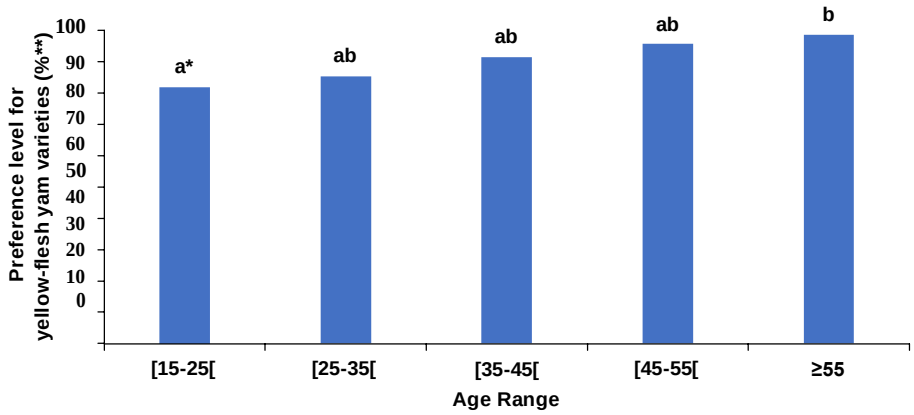

Fig. 10.Preference level for yellow-flesh yam varieties by age group
*[Different letters indicate that there are significant differences ($p<0.05$) according to the Marascuilo procedure].
**Percentage

Preference for yellow-fleshed yam varieties by ethnic group

Preference for yellow-fleshed yam varieties varies between ethnic groups (Fig. 11). Indigenous people had the highest preference for yellow-fleshed yam varieties (94.74%), while non-Ivorian allochthones had the lowest preference (90.29%). Furthermore, the Chi-square independence test showed that the observed Chi-square value ($\chi^2\_obs = 0.77$) is lower than the theoretical Chi-square value ($\chi^2\_théo = 5.99$). Therefore, there is independence between the characteristics of preference for yellow-fleshed yam varieties and ethnic group. Additionally, the Chi-square homogeneity test indicated that there aren't significant differences ($p > 0.05$) between the preferences for yellow-fleshed yam varieties among different ethnic groups.

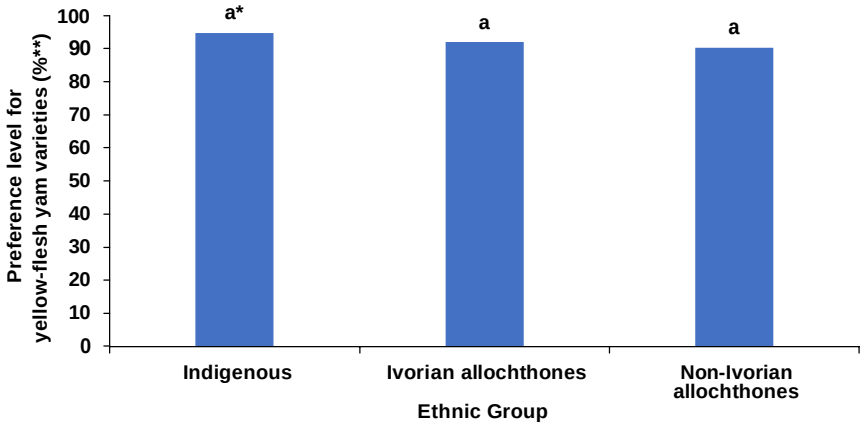

Fig. 11.Preference level for yellow-flesh yam varieties by ethnic group
*[Common letters indicate that there aren't significant differences (p > 0.05) according to the Chi-square test for homogeneity].
**Percentage

Preference for yellow-fleshed yam varieties by education level

Preference for yellow-fleshed yam varieties varies by education level (Fig. 12). People with secondary education have the highest preference rate for yellow-fleshed yam varieties, at 94.87%. Moreover, the Chi-square independence test revealed that the observed Chi-square value (χ^2_obs = 1.08) is lower than the theoretical Chi-square value (χ^2_théo = 7.81). There is independence between the characteristics of preference for yellow-fleshed yam varieties and education level. Additionally, the Chi-square homogeneity test indicated that there aren't significant differences (p > 0.05) between the preferences for yellow-fleshed yam varieties among different education levels.

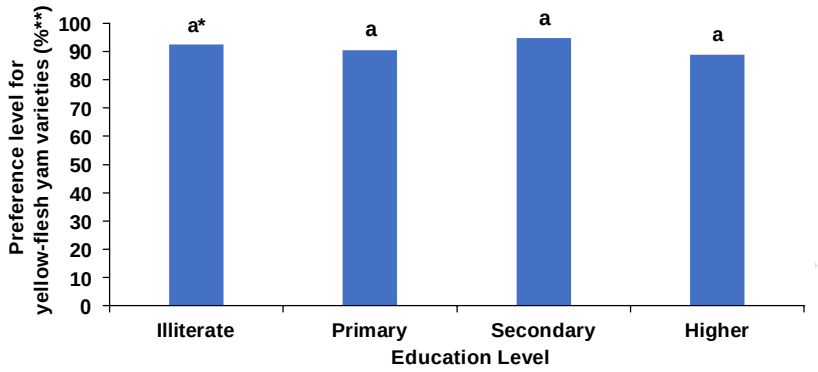

Fig. 12.Preference level for yellow-flesh yam varieties by education level
*[Common letters indicate that there aren't significant differences (p > 0.05) according to the Chi-square test for homogeneity].
**Percentage

Level of chemical weeding use

Distribution of chemical weeding use by department

The use of chemical weeding varies relatively from one department to another (Fig. 13). Chemical weeding is more widespread in the Sakassou department with a proportion of 52%. Additionally, the Chi-square independence test showed that the observed Chi-square value ($\chi^2\_obs = 2.13$) is lower than the theoretical Chi-square value ($\chi^2\_théo = 7.81$). Consequently, there is no dependence between the characteristics of chemical weeding use and the department. Moreover, the Chi-square homogeneity test indicated that there aren't significant differences ($p > 0.05$) between the use of chemical weeding across different departments.

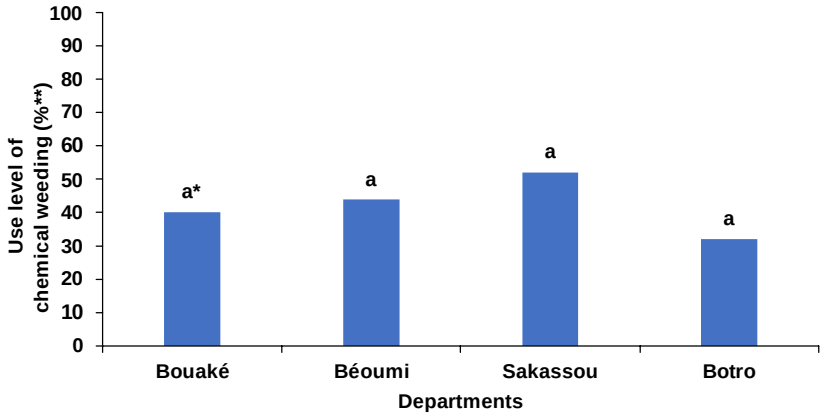

Fig. 13. Use level of chemical weeding by department
*[Common letters indicate that there aren't significant differences (p > 0.05) according to the Chi-square test for homogeneity].
**Percentage

Distribution of chemical weeding use by gender

The use of chemical weeding varies relatively by gender (Fig. 14). Chemical weeding is more practiced by men (44.83%) than by women (23.08%). The Chi-square independence test revealed that the observed Chi-square value (χ^2_obs = 2.19) is lower than the theoretical Chi-square value (χ^2_théo = 3.84). There is no link between the characteristics of chemical weeding use and gender. Additionally, the Chi-square homogeneity test indicated that there aren't significant differences (p > 0.05) between the use of chemical weeding among different genders.

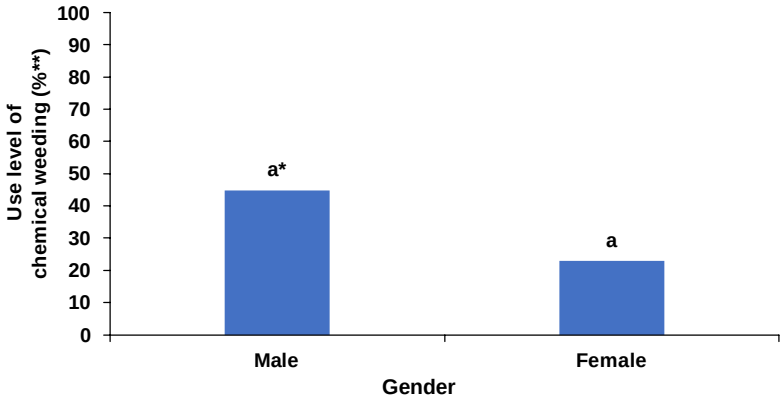

Fig. 14.Use level of chemical weeding by gender
*[Common letters indicate that there aren't significant differences (p > 0.05) according to the Chi-square test for homogeneity].
**Percentage

Distribution of chemical weeding use by age group

The use of chemical weeding varies by age group (Fig. 15). People over 55 years old use chemical weeding the most, at a rate of 76.47%, followed by the [45-55[, [35-45[, and [25-35[age groups with respective rates of 41.46%, 38.89%, and 33.33%. The Chi-square independence test indicated that the observed Chi-square value (χ^2_obs = 15.34) is higher than the theoretical Chi-square value (χ^2_théo = 9.48). There is a link between the variables of chemical weeding use and age group. Moreover, the Chi-square homogeneity test showed that there is at least one significant difference ($p < 0.05$) between the variables of chemical weeding use and age groups. The Marascuilo procedure indicated only one significant difference ($p < 0.05$) between the use of chemical weeding among the [15-25[age group and those in the [35-45[, [45-55[, and ≥55 age groups.

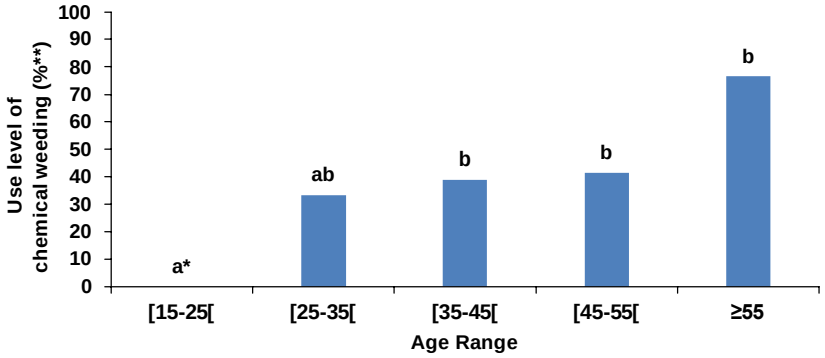

Fig. 15.Use level of chemical weeding by age group
*[Different letters indicate that there are significant differences ($p<0.05$) according to the Marascuilo procedure].
**Percentage

Distribution of chemical weeding use by ethnic group

The use of chemical weeding varies between ethnic groups (Fig. 16). Non-Ivorian allochthones predominantly use chemical weeding (44.44%), followed by indigenous people (42.03%) and Ivorian allochthones (40.91%). Additionally, the Chi-square independence test showed that the observed Chi-square value (χ^2_obs = 0.033) is lower than the theoretical Chi-square value (χ^2_théo = 5.99). Consequently, there is no link between the characteristics of chemical weeding use and ethnic group. Moreover, the Chi-square homogeneity test indicated that there aren't significant differences ($p > 0.05$) between the use of chemical weeding among different ethnic groups.

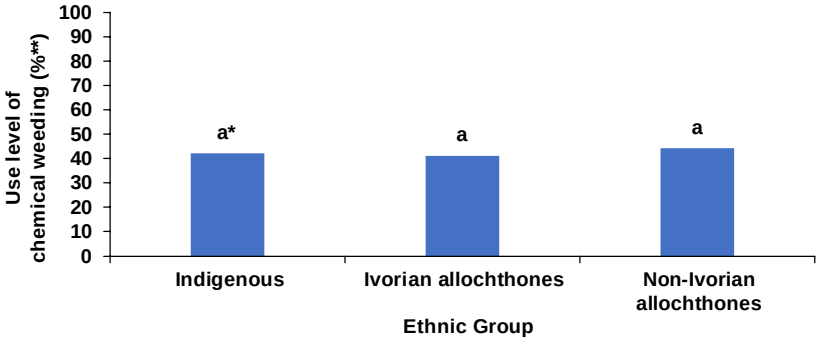

Fig. 16.Use level of chemical weeding by ethnic group

*[Common letters indicate that there aren't significant differences (p > 0.05) according to the Chi-square test for homogeneity].

**Percentage

Distribution of chemical weeding use by education level

The use of chemical weeding varies by education level (Fig. 17). People with secondary education use chemical weeding the most, at a rate of 50.00%. Additionally, the Chi-square independence test revealed that the observed Chi-square value (χ^2_obs = 0.23) is lower than the theoretical Chi-square value (χ^2_théo = 5.99). There is no link between the characteristics of chemical weeding use and education level. Moreover, the Chi-square homogeneity test indicated that there aren't significant differences (p > 0.05) between the use of chemical weeding among different education levels.

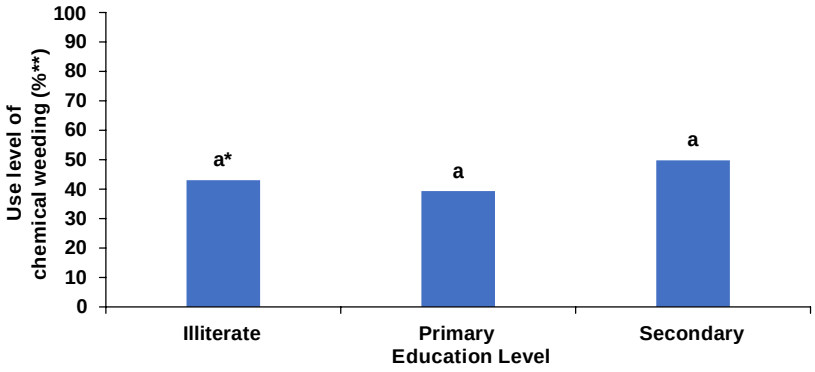

Fig. 17.Use level of chemical weeding by education level

*[Common letters indicate that there aren't significant differences (p > 0.05) according to the Chi-square test for homogeneity].

**Percentage

4. DISCUSSION

The ethnobotanical study highlighted a dependency between gender, age group, ethnicity, educational level, and the dichotomous variable of knowledge level. This observation shows that these characteristics influence the level of knowledge. Regarding gender, the study exposed that the knowledge levels of yellow-flesh yam varieties between women and men differ significantly ($p < 0.05$). Furthermore, the highest level of knowledge is observed among women, suggesting that women are more knowledgeable about yellow-flesh yam varieties. This can be explained by the fact that women are the primary holders of culinary knowledge and practices. Indeed, in African tradition, food plants are better known and utilized by women. Thus, these plants, which are subjects of culinary knowledge and practices, are first known by women and passed down from mother to daughter [10]. The study results showed that knowledge of yellow-flesh yam varieties increases significantly ($p < 0.05$) with age. In fact, individuals aged 55 and older possess the highest level of knowledge. This result is likely because older individuals are more likely to provide reliable information, as they hold a substantial part of ancestral knowledge transmitted orally [11-13]. The results corroborate those reported by [14], who found that the majority of the surveyed population with ethnobotanical knowledge falls into the age group over 50. Additionally, [15] showed that an individual's age influences their plant knowledge level. However, socio-economic factors, including rural exodus, the introduction of "Westernized" education, and a market-driven capitalist economy, influence traditional knowledge transmission [16]. Unfortunately, the oral transmission process is breaking down, and most traditional knowledge now exists only in the memories of the elderly, gradually disappearing as they pass away [17]. Thus, the transmission of this knowledge is currently at risk because it is not always assured [18], explaining the low level of knowledge about yellow-flesh yam varieties among the new generation. Regarding ethnicity, the study revealed that knowledge levels of yellow-flesh yam varieties among natives differ significantly ($p < 0.05$) from those of non-natives and non-Ivorian immigrants. Furthermore, the highest level of knowledge is observed among natives. This result suggests that natives are more knowledgeable about yellow-flesh yam varieties. This could be due to varying food preferences among ethnic groups [19]. Additionally, this good knowledge of yellow-flesh yam varieties may be because the natives in the study area belong to the Akan cultural group, particularly the Baoulé people, who are agriculturalists with a significant focus on yam cultivation. Indeed, the location in the savanna is conducive to growing *Dioscorea cayenensis-rotundata* [20]. Furthermore, yam has socio-cultural importance, as it is celebrated during a festival called the "yam festival," which is a cornerstone of socio-cultural activities [21]. Regarding educational level, the ethnobotanical study indicated that illiterate individuals, representing 83.97%, have better knowledge of yellow-flesh yam varieties. Moreover, the knowledge levels of illiterate individuals differ significantly ($p < 0.05$) from those with secondary and higher education. This may be because less educated individuals remain more attached to their cultural values, whereas more educated individuals tend to adopt Western lifestyles [22]. Indeed, holders of ancestral knowledge may have high illiteracy rates, and their main source of ethnobotanical information is family knowledge passed down by older individuals [14]. The ethnobotanical survey on the preference for yellow-flesh yam varieties revealed a dependency only between age group and preference. This indicates that preference varies with age group. The study showed that individuals aged 55 and older exhibit a strong preference for these varieties, with a proportion of 98.61%. This observation could be related to factors such as culinary preferences acquired over time, dietary habits, or health and nutrition aspects that become more significant with age. The ethnobotanical study on cultural practices revealed a dependency between age group and chemical weeding. This result shows that this characteristic significantly ($p < 0.05$) influences the use of chemical weeding. Thus, individuals aged 55 and older are the most likely to use chemical weeding. This could be due to the difficulty in obtaining labor for these older individuals. Indeed, the use of herbicides reduces the need for labor, which is not only costly but also scarce in recent times [23].

5. CONCLUSION

The objective of this survey was to determine the knowledge levels, preference for traditional yellow-flesh yam varieties, and use of chemical weeding in plantations in the Gbêkê region to contribute to theirS revitalization. This study reveals that the yellow-flesh yam varieties "Kounougbé" and "Kangba" of *D. cayenensis-rotundata* are less known among the younger generations in the study area, which could justify their disappearance. However, natives, particularly women, illiterates, and especially individuals aged 55 and older, have a good knowledge of these varieties. Regarding chemical weeding, this practice is increasingly common and intensifies with age, such that the level of use increases significantly with age. Furthermore, the information related to the study and the dietary interest given by the populations of Central Côte d'Ivoire to the varieties "Kounougbé" and "Kangba" of *D. cayenensis-rotundata* could serve as a basis for developing a strategy for their revitalization. Similar to these varieties, it would be useful to conduct studies on other cultural practices in yam-based cultivation systems for these endemic yellow-flesh varieties as well as other varieties. This would help establish a national inventory and promote their revitalization.

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