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Agromorphological Characteristics and Tuber Quality of Several Local Papua Sweet Potato (*Ipomoea batatas* L.) Genotypes in Prafi Mulya Village, Manokwari

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ABSTRACT

Papua is recognized as a secondary center of sweet potato diversity, yet many local genotypes have not been thoroughly characterized for their agronomic performance and tuber quality. This study aimed to evaluate the agromorphological traits and tuber quality of 12 local Papuan sweet potato genotypes. The research was conducted in Prafi Mulya Village, Manokwari, West Papua, from August 2024 to January 2025 using a Randomized Block Design with three replications. The results revealed considerable variation among the genotypes in both growth and yield characteristics. During the early growth stage, Numfor-01 and Manokwari-01 exhibited the longest vines, indicating strong early vigor. In the later growth stage, Airani and Tinta-01 showed superior vegetative growth through greater vine length. Koya-4 produced the highest number of branches, suggesting a greater potential for photosynthetic activity and plant development. Differences were also observed in yield components. Lokal Sorong produced the highest number of tubers per plant, averaging seven tubers, while Nabire, Numfor-01, and Prafi-01 each produced six tubers per plant. Airani recorded the largest tuber diameter (10.99 cm), followed by Nabire (10.48 cm). The longest tubers were produced by Nabire (21.52 cm), followed by Airani (21.21 cm). In terms of productivity, Nabire achieved the highest yield at 37.13 t/ha, followed by Lokal Sorong (29.13 t/ha) and Numfor-01 (27.60 t/ha), all exceeding the average sweet potato productivity in Papua. Tuber quality also varied significantly among genotypes. Manokwari-01 had the lowest water content (66.73%) and the highest dry matter content (39.26%), indicating good processing potential. Numfor-01 showed the highest sweetness level at 12.27°Brix. Overall, the study confirmed substantial agromorphological and quality variation among local Papuan sweet potato genotypes, highlighting their value as genetic resources

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INTRODUCTION

Sweet potato (Ipomoea batatas L.) is an important agricultural commodity that is widely found, cultivated, and distributed throughout Indonesia (Purbasari & Sumadji, 2018). This crop has high economic value because it provides direct benefits to the community. Added value from sweet pota-toes is obtained through processing into various food products, animal feed, and medicinal ingredi-ents. Furthermore, its high fiber content makes sweet potatoes good for digestive health (Sani et al., 2019).

As an alternative food source, sweet potatoes have great potential to replace rice, with a complete nutritional content including carbohydrates, protein, fat, vitamins A, B, C, and E, and essential miner-als such as phosphorus, potassium, and magnesium (Suparno et al., 2016). Sweet potatoes are also rich in energy, have a low glycemic index, and contain beta-carotene and antioxidants, which are beneficial in boosting the immune system and maintaining overall health (Purbasari & Sumadji, 2018; Fitria et al., 2021; Laveryano-Santos et al., 2022). With these characteristics, sweet potatoes play a strategic role in supporting national food security.

Sweet potato genetic diversity is a crucial aspect of agronomy and plant breeding programs. Phe-notypic and genotypic variability provides breeders with greater opportunities to discover superior va-rieties with high productivity and resistance to environmental conditions. Shaumi et al. (2011) empha-sized that genetic diversity is an indicator of successful selection in developing new varieties. Sweet potatoes also have broad adaptability, growing in areas ranging from low-temperature highlands to high-temperature lowlands. Environmental factors such as temperature, humidity, light intensity, rain-fall, wind, topography, and soil properties significantly influence plant growth and morphological characteristics (Hamzah, 2010; Soemarno et al., 2015).

West Papua, with its diverse topography, from mountainous to coastal, has an agro-ecosystem that supports sweet potato development. This ecosystem variation has given rise to local varieties that are able to adapt to specific regional conditions. The genetic diversity of sweet potatoes in Papua is evident in morphological variations such as tuber skin and flesh color, growth type, tuber number and weight, and other agromorphological characteristics (Sinon et al., 2025; Wasti et al., 2025). However, the potential for developing sweet potatoes as a local food source is often hampered by complex geo-graphic conditions. Therefore, testing the adaptation of local genotypes, through identifying their spe-cific characteristics in Manokwari Regency, is crucial to find varieties with high adaptability, maxi-mum productivity, and good nutritional content (Ginting et al., 2017).

Prafi Mulya Village in Prafi District, Manokwari Regency, is known as a rice granary with a rice paddy area of 282 hectares (Allo, 2022). However, rice production has declined in recent years due to nematode attacks (Based on direct communication with farmer groups in Prafi Mulya Village, 2024). Crop diversification is an important strategy to address declining rice production. Sweet potatoes have great potential as a supporting commodity for food diversification due to their suitable agro-ecosystem conditions and supportive natural resources (Hapsari et al., 2019).

Based on these problems, this study was conducted to identify the agromorphological compo-nents and tuber quality of 12 local Papuan sweet potato genotypes, so that it is expected to provide scientific information for the development of superior varieties to support food security in the West Papua region.

LITERATURE REVIEW

Sweet potato (*Ipomoea batatas* L.) belongs to the family Convolvulaceae and is one of the most widely produced commodities in the world, ranking after wheat, rice, maize, potato, barley, and cassava (Jung et al., 2011). This crop is classified as a short-day plant, requiring 11–12 hours of sunlight per day. Almost all soil types are suitable for sweet potato cultivation; however, the most favorable soils are sandy loam, friable, rich in organic matter, with good aeration and drainage. The optimal soil pH ranges from 5.5 to 7.5, and young plants require adequate soil moisture (Khalil, 2016). Sweet potato grows best in tropical climates at altitudes between 500 and 1,000 m above sea level.

The characterization of agromorphological traits and tuber quality is essential for identifying promising genotypes that can be utilized in breeding programs and local cultivation strategies. Agromorphological traits such as vine length, diameter, and canopy development are key indicators of plant vigor and adaptation. Studies by Lebot (2010); Woolfe (1992) emphasize that variability in these traits reflects genetic diversity and environmental interactions.

Yield-related traits, including tuber number per plant, tuber weight, length and diameter are critical for evaluating productivity. Research by Paiki et al. (2024) and Merahabia et al. (2025) on Papuan genotypes demonstrated significant variability, with some accessions (e.g., Nabire, Numfor-01, Lokal Sorong) showing superior yield performance. These findings highlight the importance of genotype × environment interactions in determining yield potential.

The quality of sweet potato tubers is an important factor that determines consumption value, consumer preference, and industrial processing potential. These quality traits encompass physical, chemical, and sensory aspects that are interrelated (Moorthy et al., 2012).

RESEARCH METHODS

This research was conducted in Prafi Mulya Village, Prafi District, Manokwari Regency, West Papua Province. Prafi Mulya Village is located at coordinates 0°55′04″ South Latitude and 133°53′34″ East Longitude, at an elevation of 50 meters above sea level. The study lasted for six months, from August 2024 to January 2025.

The materials used in this study included 12 local Papuan sweet potato genotypes, goat ma-nure, and Mutiara NPK fertilizer (16:16:16). The tools used in this study included an oven, refrac-tometer, scales, calipers, tape measure, camera, and various other equipment.

The study used an experimental method with a Randomized Block Design (RBD) (Gomez & Gomez, 1984). The treatments were 12 local Papuan sweet potato genotypes (Table 1), with three replications.

Table 1. Names And Origins Of 12 Local Papuan Sweet Potato Genotypes

No.	Genotype	Origin
1.	Mokwam	Manokwari
2.	Numfor-01	Biak
3.	Manokwari-01 Ungu	Manokwari
4.	Koya-4	Jayapura
5.	Lokal Sorong	Sorong
6.	Airani	Serui
7.	Amban Pantai-02	Manokwari
8.	Nabire	Nabire
9.	Tinta-01	Biak
10.	Lokal Manokwari	Manokwari
11.	Prafi-01	Manokwari
12	Biak-01	Biak

Research Implementation

Land Preparation

The land was cultivated using a tractor, loosened, and leveled with a hoe, then raised beds were created. The beds were 30 cm high, 1 m wide, and 4 m long. The spacing between beds was 50 cm, and the spacing between replications was 100 cm. The total area used was 255 m2 (24.5 m long x 20 m wide).

Fertilization

A basal fertilizer, consisting of goat manure, was applied to each bed at a dose of 12 kg per bed. The basal fertilizer was applied by spreading it over the soil surface of each bed one week before planting. Fertilization was based on the results of a soil analysis conducted at the Soil Laboratory, Agricultural Instrument Standardization Agency, Cimanggu, Bogor. The soil physics analysis was conducted at the Soil and Land Resources Laboratory, Facul-ty of Agriculture, University of Papua. Based on the soil analysis results, follow-up fertilizer, 300 kg/ha (120 g/bed), was applied twice: 60 g/bed one week after planting, and the remain-ing 60 g/bed five weeks after planting, buried in the soil furrow approximately 8 cm beside the planting hole.

Planting

Planting material, derived from shoot cuttings, was planted in the prepared beds. Before planting, the cuttings were stored in a humid place for one day. Eight cuttings per bed were planted in a single row in the center of the bed. One cutting was planted in each planting hole. The spacing between cuttings within the bed was 50 cm, while the outermost cuttings were 25 cm from the edge of the bed. Planting sweet potato cuttings is done by burying three stem segments (2/3 of the cutting's length) in the soil, then watering all the cuttings to keep them fresh and growing. The cuttings should be approximately 30 cm long.

Replanting

When the plants are one week old, replanting is carried out if any cuttings die. Planting ma-terial for replanting (additional cuttings) is obtained from extra plants planted in separate beds, which were prepared simultaneously with the main planting in this study. Replanting is done in the afternoon when the temperature is not too hot to prevent excessive transpira-tion from the cuttings.

Weeding

Weeding is carried out three times during the plant growth phase, tuber formation, and tu-ber development phase, namely at 2, 5, and 8 weeks after planting.

Hilling

Hilling (loosening the soil around the sweet potato plants) is carried out simultaneously with weeding.

Watering

Watering is carried out daily until the plants reach maturity. 5 weeks after planting. After that, the plant's water needs are met by rainfall. However, if rain does not fall, watering is carried out three times a week until three weeks before harvest.

Turning the Vines

Turning the vines is carried out when the vines begin to elongate and reach approximately 1.5 m, which is three weeks after planting. Subsequent vine turning is carried out every three weeks to prevent root growth at the vine nodes. Roots emerging from the vine nodes can inhibit the growth and enlargement of the tubers from the main vine.

Harvesting

Sweet potatoes are harvested when the tubers reach physiological maturity, four months af-ter planting.

Observation Variables

Agromorphological Components:

1. Length of tendrils per plant (cm). Observations were made on each plant of each geno-type, at 2 and 4 weeks after planting.
2. Number of branches per plant. The number of branches is counted on the secondary stem that grows from the main stem.
3. Number of tubers per plant and per bed. The number of tubers on each plant of each genotype was counted.
4. Bulb weight per plant and per bed (kg). Measured by weighing the tubers of each plant of each genotype.
5. Number of economic tubers per plant. By counting the number of tubers weighing more than or equal to 150 grams.
6. Tuber diameter (cm). Tuber diameter was measured at the center of the tuber, meas-ured using calipers from an average yield of 3 tubers per plant.
7. Tuber length (cm). determined by measuring the length of the tuber from the base to the tip of the tuber from 3 tubers per plant that were selected randomly.

Tuber Quality:

Tuber quality components (dry matter content, water content, and sugar content or sweetness content) are important indicators of sweet potato tuber quality. These three com-ponents determine consumption value (taste, texture, consumer preferences) as well as pro-cessing industry potential (flour, starch, bioethanol).

1. Tuber dry matter content (%). Determined based on the gravimetric method (oven drying). A total of 3 samples were prepared from 3 tubers of all test genotypes. The tuber samples were cut into thin cubes with a size of 1-2 mm and the weight of each sample was approximately 200 mg, then weighed to obtain fresh weight (BS), then dried in an oven at 70°C for 48 hours or until the dry sample weight was constant. After drying, the sample was weighed to obtain dry weight (DW). Dry matter content is determined by the formula:

   $$\text{Dry matter content} = (BK/BS) \times 100\%$$

   Note: BK = weight of oven dried sweet potato sample; BS = fresh weight of tuber sam-ples.
2. Water content (KA) of tubers (%). Determined by the formula: $KA = (BS-BK)/BS \times 100\%$
3. Sweetness level of tubers. Determined with a digital refractometer (°Brix). First, the tubers are peeled, cut into small pieces or cubes in the middle of the tubers, then mashed, squeezed to get extract (juice) from the tubers. This liquid is measured with a refractometer, by dripping the tuber extract onto the prism of the refractometer.

Data Analysis

The agromorphological data and tuber quality components obtained were analyzed us-ing analysis of variance (ANOVA) to determine the effect of treatment on the observed vari-ables. If the results of the analysis show that there is a real effect between treatments, then proceed with the Least Significant Difference (LSD) test to determine the differences be-tween treatments..

RESULTS AND DISCUSSION

Analysis of Soil Physicochemical Properties

The results of the analysis of the soil physicochemical properties are presented in Table 1.

Table 2. Results of the Analysis of the Soil Physicochemical Properties at A Soil Depth of 20 Cm at the Prafi Mulya Research Site

Parameter	Concentration*	Criteria**
Texture:		Dusty clay
Sand (%)	32	-
Silt (%)	61	-
Clay (%)	7	-
pH (1:2,5)		
H_2O	6,6	Neutral
C-Organik (%)	1,17	Low

N-Total (%)	0,12	Low
Rasio C/N	10	Normal
P_2O_5 Olsen/Bray (ppm P)	20	Currently
KTK (me/ 100 g tanah)	13,33	Currently
Cation Structure:		
Ca^{2+} (me/ 100 g land)	10,43	high
Mg (me/100 g land)	1,68	Currently
K^+ (me/100 g land)	0,29	Low
Na^+ (me/100 g land)	0,33	Low
Base saturation (%)	96	Very high
Al3$^+$	0,00	There isn't any
H^+	0,35	Low

Note: *Soil analysis results from the Soil Laboratory; **Criteria based on the Soil Research Center (2005)

Soil analysis results indicated that the soil texture at the study site was silty clay with a dominant silt content. This condition makes the soil relatively loose, easy to cultivate, and quite good at retaining water, although the low clay content limits its ability to retain nutrients. A pH of 6.6 indicates neutral soil conditions, which is ideal for most plants because nutrients are optimally available within this range. However, the organic carbon (1.17%) and total nitrogen (0.12%) contents were low, indicating a lack of soil organic matter, potentially reducing fertility. Therefore, organic fertilizer in the form of goat manure was added to improve soil quality. A C/N ratio of 10 indicates normal conditions, meaning the decomposition process of organic matter is proceeding well with no indication of excess or deficiency of nitrogen relative to carbon. The avail-able phosphorus content of 20 ppm is in the moderate category, sufficient to support root growth and flowering, although it can still be increased with NPK fertilizer. The Cation Exchange Capacity (CEC) of 13.33 meO/100 g of soil is considered moderate, indicating the soil's ability to store and exchange nutrients is quite good, although not optimal, requiring regular fertilizer management.

The cation composition shows that Ca^{2+} is relatively high, supporting soil structure and plant growth, while Mg^{2+} is moderate and sufficient for plant needs. K^+ is relatively low, potentially limiting growth, especially during the generative phase, so potassium fertilizer is added through a compound NPK fertilizer. Na^+ is low, which is a good condition because high sodium levels can cause salinity problems. Base saturation reaches 96%, which is considered very high, indicating the soil is rich in bases (Ca, Mg, K, Na). Furthermore, Al^{3+} and H^+ content are very low, a favorable condition because there is no aluminum toxicity and low acidity, so it does not interfere with plant growth. Overall, the soil at the research location has fairly good fertility with neutral pH, very high base satu-ration, and moderate phosphorus availability. However, the main weakness lies in the low content of C-Organic, N-Total, and K^+, so soil management is focused on adding minimum doses of organic fer-tilizer and NPK to increase organic matter and NPK fertilizer to balance cations.

Results of the analysis of variance

Analysis of variance was conducted on all observation variables based on quantitative data from 12 local sweet potato genotypes (Table 2).

Table 3. Summary of Analysis of Variance for 12 Local Papuan Sweet Potato Genotypes

Observation Variables	Treatment 12 Genotypes	KK (%)
Tendril Length 2 MST	**	11,97
Tendril Length 4 MST	**	22,82
Number of Branches	ns	17,91
Tuber Weight per Plant	*	43,94
Bulb Weight per Plot	*	46,38
Number of Bulbs per Plant	*	25,37
Number of Economic Bulbs per Plant	ns	34,52
Bulb Diameter	**	15,48
Tuber Length	*	15,14
Water content	**	4,12
Tuber Dry Matter Content	*	15,72
Sweetness level	**	8,52

Note: ns = no significant effect ($p > 0.05$); * = significant effect ($p < 0.05$); ** = very significant effect ($p < 0.01$); KK = coefficient of diversity

The analysis results showed that the treatment of 12 local Papuan sweet potato genotypes significantly affected vine length at 2 and 4 weeks post-planting and tuber diameter. Significant effects were also observed for tuber weight per plant, tuber weight per plot, number of tubers per plant, and tuber length. The tuber quality component, water content, showed a highly significant effect ($p < 0.01$), while dry matter content showed a significant effect ($p < 0.05$), and sweetness content was highly sig-nificant ($p < 0.01$) (Table 2). Coefficient of Variance (CC) values ranged from 4.12% to 46.38% (Table 2). Most variables showed low to moderate CC, indicating a fairly good level of experimental precision. However, for yield pa-rameters such as tuber weight per plant and per plot, CC values were high even after transformation, indicating high variability between replicates, requiring careful interpretation of the results. The results of further tests conducted on the observed variables are presented in Tables 3, 4, 5, 6, 7, and 8.

Agromorphological Characteristics

Vegetative Components (Tendon Length and Number of Branches)

The vegetative components observed included tendon length at 2 and 4 weeks after planting (WAP) and the number of branches.

Table 4. Tendron Length at 2 and 4 WAP, and Number of Branches for 12 Local Papuan Sweet Potato Genotypes

Genotype	Tendril Length 2 MST (cm)	Tendril Length 4 MST (cm)	Number of Branches

Mokwam	28,70	d	138,66	abc	4,10	a
Numfor-01	53,70	a	166,60	abc	4,67	a
Manokwari-01	52,07	a	186,80	ab	4,80	a
Koya-4	34,73	cd	104,76	cd	5,76	a
Lokal Sorong	27,80	d	57,26	d	4,10	a
Airani	47,90	ab	210,46	a	4,23	a
Amban Pantai-02	44,57	abc	194,80	ab	3,66	b
Nabire-1	36,53	bcd	167,73	abc	3,63	b
Tinta-01	46,03	abc	210,53	a	3,90	b
Lokal Manokwari	48,37	a	146,66	abc	4,16	a
Prafi-01	46,97	ab	137,63	abc	4,46	a
Biak-01	31,37	d	119,93	bcd	3,93	a
BNT 1%	11,45		80,62	1,76		

Note: Numbers followed by the same letter in the same column indicate no significant difference at the 99% confi-dence level.

The analysis results showed significant differences in the length of tendrils at 2 WAP, 4 WAP, and the number of branches among the various genotypes. In the early growth phase (2 WAP) (Table 3), the Numfor-01 genotype displayed the highest tendril length (53.70 cm), followed by Manokwari-01 and Local Manokwari with 52.07 cm and 48.37 cm, respectively, but there was no significant differ-ence between the three genotypes, and these three genotypes were not significantly different from the Aairani, Amban Pantai-02, Tinta-01, and Prafi-01 genotypes. In contrast, several other genotypes such as Local Sorong and Mokwam had the lowest tendril length, at 27.80 cm and 28.70 cm, respec-tively, but there was no significant difference from the Biak-01, Koya-4, and Nabire genotypes which produced longer tendrils compared to the two genotypes. In the advanced phase (4 WAP) (Table 3), the Airani and Tinta-01 genotypes stood out with tendril lengths reaching more than 210 cm, but were not significantly different from several other genotypes such as Mokwam, Numfor-01, Manokwari-01, Amban Pantai-02, Nabire, Local Manokwari and Prafi-01 indicating the potential for spreading vegetative growth of tendrils. In contrast, Local Sorong again showed the lowest value with a tendril length of 57.26 cm and was significantly different from other genotypes except Koya-04 and Biak-01. In accordance with the criteria based on the morphological description of sweet potato plants (Huaman, 1991), the local Sorong genotype is a plant with an upright growth type (tendrils length <75 cm), Koya-04 and Biak-01 are classified as semi-erect types (75-150 cm), while the other geno-types are classified as spreading, (151-250 cm).

The number of branches also varied between genotypes (Table 3), with Koya-4 having the most branches (5.76 branches), which has the potential to increase productivity due to the greater number of growing points, but was not significantly different from several other genotypes (Table 3). Mean-while, Nabire-1 and Amban Pantai-02 had the fewest branches, with 3.63 and 3.66 branches, respec-tively, not significantly different from the other genotype, Tinta-01. The 1% BNT values of 11.45 cm (vine length 2 WAP), 80.62 cm (vine length 4 WAP), and 1.76 (number of branches) indicated signif-icant differences between genotypes, particularly in the length of the vine at 4 WAP.

Overall, genotypes with long tendrils showed good vegetative vigor potential, while genotypes with a high number of branches, such as Koya-4 and several other genotypes, had the potential to produce more tubers. In contrast, the Sorong Local genotype consistently exhibited lower tendril growth and branch counts compared to other genotypes. This variation is important in selecting genotypes for cul-tivation purposes, both for vegetative vigor and branch productivity. The significance of these results indicates significant genetic diversity among genotypes in terms of tendril length and branch count, which has direct implications for vegetative vigor and potential plant productivity. A study on sweet potatoes by Kar et al. (2022) examined 15 sweet potato genotypes and found that tendril length, num-ber of branches per plant, and total leaf area were positively correlated with tuber yield per hectare. Other studies have also reported that variability in tendril length, tendril weight, and tuber weight per plant can be used as a basis for increasing sweet potato productivity. Genotypes with long tendrils and numerous branches tend to produce higher biomass and support optimal tuber formation (Markam et al., 2026). This confirms that vegetative vigor (long tendrils) and productive branching are important indicators in determining the final yield of the plant. However, several other studies have stated that the vegetative characteristics of sweet potato plants reflect growth vigor more than tuber productivity, so the relationship with yield can be weak or insignificant. In this study, for example, the Nabire and Sorong local genotypes had the shortest tendrils and fewer branches compared to other genotypes, but produced the highest tuber yield. According to Demelie & Aragaw (2016), tendril length did not sig-nificantly affect tuber yield. Although often considered an indicator of vegetative vigor, it does not always reflect tuber productivity. Sweet potato genotypes with long tendrils may allocate more assimi-lates to vegetative growth than tuber formation, and a high number of branches does increase growing points, but does not automatically increase tuber yield. Under certain conditions, branching actually diverts assimilates to leaves and stems, so that tuber yield does not increase. Thus, the balance be-tween source organs (leaves) and sinks (tubers) is very important to maximize photosynthetic capacity and the efficiency of assimilate allocation to tubers, thereby supporting plant productivity.

Tuber yield components (number, weight, diameter, length of tubers)

Number of Tubers

Table 4. Total and Economic Number of Tubers Per Plant in 12 Local Papua Sweet Potato Genotypes

Genotype	Number of tubers per plant*)	Number of economic tubers**)
Mokwam	4,33 abc	2,33 a

Numfor-01	4,67 abc	1,67 a
Manokwari-01	5,33 abc	2,00 a
Koya-4	3,33 bc	2,00 a
Lokal Sorong	6,67 a	2,33 a
Airani	2,67 c	2,33 a
Amban Pantai-02	6,00 a	2,67 a
Nabire	6,00 ab	2,33 a
Tinta-01	4,67 abc	2,00 a
Lokal Manokwari	4,00 abc	2,67 a
Prafi-01	6,00 ab	2,67 a
Biak-01	5,00 abc	1,67 a
BNT 1%	2,87	ns

Note: Numbers followed by the same letter in the same column indicate no significant difference at the 99% confi-dence level.
*). Box-Cox transformation; **). Log x+1 transformation

The BNT test results in Table 4 show that the Sorong local genotype (6.67 tubers) produced the high-est number of sweet potato tubers per plant, significantly different from the Airani genotype (2.67 tu-bers). However, this was not significantly different from other genotypes, such as Amban Pantai-02, Nabire, and Prafi-01, which each produced 6.00 tubers per plant. This was also not significantly dif-ferent from the other genotypes.

Meanwhile, the number of economic tubers did not show any significant differences between geno-types. In contrast, Wera et al. (2014) stated that the potential for tuber formation among sweet potato genotypes is quite diverse. Furthermore, Wera et al. (2014) in Papua New Guinea reported that the agronomic diversity of local sweet potatoes, including the number of tubers per plant, is very high, making it suitable for selection of superior varieties. In this study, the number of economic tubers among genotypes was relatively uniform, although the total tuber number varied significantly. This indicates that environmental factors and cultivation management are more dominant in determining the proportion of economic tubers. Soplanit et al. (2018) emphasized that variety adaptation to Papua's agroecological conditions significantly influences yield quality, including tuber size and distribution. Genotypes with a high tuber count (Local Sorong, Nabire, Prafi-01) have the potential to be devel-oped for productivity. However, because the number of economic tubers is relatively uniform, inten-sive cultivation strategies (fertilization, plant spacing, water management) are needed to increase the proportion of economic tubers. Vinod et al. (2024) also added that high genetic variability in sweet potato yield components is the basis for selecting superior varieties. However, Vinod et al. (2024) also emphasized that selection of superior varieties should consider not only yield components such as productivity but also tuber quality simultaneously, not just total tuber number. The genetic diversity of local Papuan sweet potatoes remains an important asset for breeding productive superior

varieties. Therefore, cultivation strategies are needed to ensure that superior genotypes are not only productive but also produce tubers of economic quality.
Tuber Weight

Table 5. Tuber Weight Per Plant and Per Bed of 12 Local Papua Sweet Potato Genotypes

Genotype	Tuber Weight per Plant (kg)		Weight of tubers per bed (kg)*)	
Mokwam	0,52	cd	3,02	b
Numfor-01	1,92	ab	11,04	ab
Manokwari-01	0,41	d	6,28	ab
Koya-4	1,10	abcd	5,62	ab
Lokal Sorong	1,39	abcd	11,65	ab
Airani	1,33	abc	7,48	ab
Amban Pantai-02	1,18	abcd	6,22	ab
Nabire	2,52	a	14,85	a
Tinta-01	0,86	bcd	4,94	ab
Lokal Manokwari	1,14	abcd	5,72	ab
Prafi-01	1,45	abc	8,68	ab
Biak-01	1,29	abcd	7,05	ab
BNT 1%	1,27		8,23	

Note: Numbers followed by the same letter in the same column indicate no significant difference at the 99% confi-dence level. *). Log transformation x+1*).

In terms of agromorphological characteristics of yield components, tuber weight per plant and per bed showed that most genotypes did not differ significantly in their production capacity, except for the Mokwam and Nabire genotypes, which showed a significant difference in tuber weight per bed (Ta-ble 4). However, tabulated data showed a tendency for the Nabire, Numfor-01, and Sorong Local genotypes to consistently produce the highest tuber weight (both per plant and per plot) compared to the other genotypes. This finding confirms that, in terms of production components, these three geno-types are worthy of consideration as potential candidates in breeding programs oriented towards in-creasing sweet potato productivity. Other genotypes have the potential to be improved through fertili-zation, land management, and cultivation techniques. Genotypes with lower yields remain important as sources of genetic diversity, for example for resistance to environmental stress or other characteris-tics. The Nabire genotype showed tuber yields of more than 2.2 kg per plant and 14.85 kg/plot, or a productivity equivalent to 37,125 kg/ha (37.125 t/ha), far exceeding other genotypes. In contrast, Mokwam (7.5 t/ha) showed the lowest productivity. In this study, the Sorong Local genotype pro-duced 11.85 kg of tubers/bed, or a tuber productivity of 29.13 t/ha. However, research results from Paiki (2024) in Klama-nak, Sorong, Southwest Papua, showed that the Mokwam genotype provided higher productivity (20.40 t/ha), and the Sorong Local genotype lower (20 t/ha). This yield is higher than the average production in Papua of 12-13 t/ha and the national average of 15 t/ha (BPS, 2015). These results indicate a strong influence of environmental and location factors on the productivity of local Papuan sweet potatoes. This confirms the existence of genotype × environment interactions that influence the yield of local Papuan sweet potatoes and the presence of significant genetic diversity, including those of Nabire, Mokwam, and Sorong. This variability explains why genotype performance differs across locations, due to genetic adaptation to specific agroecological conditions. These results are supported by Merahabia et al. (2025), who reported that the yield of local Papuan sweet potatoes is relatively high, but depends on their interaction with the environment. The differences in yield between genotypes indicate strong genetic variability (Mawikere et al., 2025). This is in line with the findings of Wera et al. (2014) in Papua New Guinea, which found that agronomic variability in sweet potatoes can be utilized for breeding programs. However, variety adaptation to environmen-tal conditions significantly affects productivity. This explains why some local genotypes show low yields in one location despite having superior genetic potential in other locations, a finding also sup-ported by Soplanit et al. (2018). Therefore, superior Papuan genotypes, such as Nabire and others, need to be tested in different locations to ensure growth and yield stability. Maulana et al. (2020) also showed that sweet potato yield stability is strongly influenced by the interaction between genotype and environment.

Tuber Diameter and Length

Table 6 shows that the Airani genotype produced the largest tuber diameter, at 10.99 cm. This was not significantly different from the Nabire genotype (10.48 cm), but significantly different from other genotypes, such as Mokwam (3.88 cm), Manokwari-01 (3.79 cm), and other genotypes.

Meanwhile, the Nabire genotype produced the largest tuber length, at 21.52 cm, which was not signif-icantly different from the Airani genotype (21.21 cm), but significantly different from the Mokwam genotype (13.54 cm) and the other genotypes.

Table 6. Tuber Diameter and Tuber Length Per Plot Of 12 Local Papuan Sweet Potato Genotypes

Genotype	Tuber Diameter (cm)		Tuber Length (cm)	
Mokwam	3,88	f	13,54	d
Numfor-01	5,77	def	15,09	cd
Manokwari-01	3,79	f	15,53	bcd
Koya-4	6,89	cd	16,67	abcd
Lokal Sorong	8,17	bc	16,79	abcd
Airani	10,99	a	21,21	ab
Amban Pantai-02	6,10	cdef	15,85	abcd
Nabire	10,48	ab	21,52	a
Tinta-01	5,48	def	15,42	bcd
Lokal Manokwari	4,43	ef	16,48	abcd
Prafi-01	6,36	cde	19,89	abc
Biak-01	6,74	cde	17,96	abcd
BNT 1%	2,35		5,98	

Note: Numbers followed by the same letter in the same column indicate no significant difference at the 99% confi-dence level.

The tuber diameter and length of the Airani and Nabire genotypes were not statistically significantly different. The tuber diameter and length of both genotypes were higher, although not significantly dif-ferent from several other genotypes (Table 6). However, the variation in tuber diameter and length among local genotypes can be used as a basis for selecting superior varieties. Tuber diameter and length are key indicators of productivity and quality and are strongly influenced by genotype and en-vironment (Pavithra et al., 2022; Wasti et al., 2025; Leurima et al., 2023). Although Airani produced the longest diameter and tuber length, its productivity was not high. However, Airani and other genotypes with moderate tuber production still have the potential to be superior candidates if improvements are made in photosynthetic efficiency, assimilate distribution to the tuber, and yield stability through genotype and environmental management. With these improved physiological characteristics and adaptability, Airani can be directed to become a more competitive genotype in sweet potato breeding programs. Nabire can be a focus in local Papuan sweet potato breeding programs, due to its large tu-ber size and high productivity. Other genotypes continue to serve as sources of diversity for various other superior traits. According to Junior et al. (2025), among the main requirements for a genotype to be used as material for developing superior sweet potato varieties are high productivity and good tuber quality.

Tuber Quality Components

Moisture Content, Dry Matter Content, and Sweetness

The results of the BNT (Large-Scale Average) further test at the 99% confidence level for the mois-ture content parameter were the highest for the Nabire genotype, at 80.31%. This was not significantly different from the Sorong local variety, Amban Pantai-02, and Biak-01, but significantly different from the other genotypes. In contrast, the Manokwari-01 genotype (66.73%) produced the lowest moisture content, not significantly different from the Manokwari Local genotype (67.98%) and the other genotypes (Table 7).

In Table 7, the Manokwari-01 genotype produced the highest dry matter content at 39.26%, not sig-nificantly different from the Mokwam (30.01%) and Manokwari Local genotypes (32.01%), but sig-nificantly different from the other genotypes. Regarding sweetness, the Numfor-01 genotype showed the highest sweetness level at 12.27°Brix, significantly different from all other genotypes. °Brix indi-cates the amount of soluble solids, primarily sugar (sucrose), in solution. 1°Brix ≈ 1 gram of sucrose per 100 grams of solution. The higher the °Brix value, the sweeter the food (Jaywant et al., 2022; Novestiana & Hidayanto, 2020).

Table 7. Moisture Content, Dry Matter Content, and Sweetness Levels Of 12 Local Papuan Sweet Potato Genotypes

Genotype	Water content (%)	Dry Matter Content (%)	Sweetness Level (oBrix)

Mokwam	69,98	bcd	30,01	ab	8,80	b
Numfor-01	71,80	bcd	28,19	bc	12,27	a
Manokwari-01	66,73	d	39,26	a	5,90	c
Koya-4	71,02	bcd	28,97	bc	5,93	c
Lokal Sorong	73,64	abc	26,35	bc	9,13	b
Airani	71,16	bcd	28,83	bc	3,57	d
Amban Pantai-02	74,87	ab	25,12	bc	8,87	b
Nabire	80,31	a	19,68	c	4,07	d
Tinta-01	72,59	bcd	27,41	bc	9,30	b
Lokal Manokwari	67,98	cd	32,01	ab	4,93	cd
Prafi-01	72,32	bcd	27,68	bc	8,80	b
Biak-01	73,75	abc	26,24	bc	5,73	c
BNT 1%	6,85		10,24		1,43	

The results of the BNT (Low Nutrient Content) test in Table 7 show significant differences between local Papuan sweet potato genotypes in tuber quality components (moisture content, dry matter con-tent, and sweetness). This confirms that genetic variability affects not only productivity but also con-sumption quality and nutritional value.

Alam et al. (2024) emphasized that dry matter content and sweetness are key components in the selec-tion of sweet potato genotypes for consumption and industry. A multi-location study conducted in South Asia by Alam et al. (2024) showed that dry matter content and sweetness are key indicators of sweet potato genotype quality, as they influence sweetness, texture, and starch industrial potential. Alam et al.'s (2024) study used statistical indices to select superior genotypes with high stability. The results showed that dry matter content determines starch content and shelf life, while °Brix correlates with sweetness, making both important parameters for breeding and commercialization. Dango et al. (2025) stated that agronomic analysis should emphasize that dry matter and sensory quality (including °Brix) are the main variables influenced by genotype × environment interactions, and therefore should be the focus of variety selection. High dry matter content improves processing efficiency (flour, starch, bioethanol).

Hejjegar et al. (2022) evaluated local genotypes, showing significant differences in dry matter and °Brix content between genotypes, which have direct implications for consumer preferences and the potential of the processing industry.

The Nabire genotype had the highest moisture content (80.31%), significantly different from Manokwari-01 (66.73%), indicating that Nabire tends to produce watery tubers, which can affect shelf life and suitability for processing into certain processed products. The Mokwam, Sorong Local, and Koya genotypes in this study (Table 7) produced moisture contents that differed from the results of Paiki et al.'s study. (2024) in Sorong, which were 71.8%, 69.91%, and 64.31%, respectively, indi-cating an interaction between genotype and environment.

The Manokwari-01 genotype produced the highest dry matter yield (39.26%), significantly different from Nabire (19.68%), and not significantly different from Mokwam (30.01%), and the Manokwari local variety (32.01%). High dry matter yields are usually correlated with better storage life and higher starch content. The Numfor-01 genotype showed a yield of 28.19%, not significantly different from Airani (28.83%), Sorong local variety (26.35%), Nabire (19.68%), and Koya 4 (28.97%). The results of research by Paiki et al. (2024) in Klamanak, Sorong, the Sorong Local genotype produced a dry matter content of 30.09%, while the Mokwam genotype produced 28.12%, and the Koya-4 genotype 35.69%. These results strengthen evidence of genotype-environment interaction.

In terms of sweetness, the Numfor-01 genotype produced the highest sweetness level (12.27 oBrix), while the Mokwam genotype produced 8.8 oBrix, the Sorong Local genotype 9.13 oBrix, and the Koya-4 genotype 5.93 oBrix. Meanwhile, the same genotypes, namely the Sorong Local genotype, Mokwam, and Koya-4 in Sorong, produced sweetness levels of 14.20 oBrix, 15.2 oBrix, and 13.00 oBrix, respectively (Paiki et al., 2024). These results confirm the existence of genotype × environment interactions. Thus, water, dry matter, and sugar content are not only determined by genetic factors, but also by agroecological conditions (soil conditions, climate). Pulungan et al. (2016) emphasized that dry matter and sugar content are yield components that are strongly influenced by genotype and envi-ronment. Therefore, genotypes with high water content have the potential to be superior for fresh con-sumption. These results are in line with the findings of Paiki et al. (2024) who showed a significant correlation between water, dry matter, and sugar content with the sensory properties of local Papuan sweet potato tubers.

CONCLUSIONS AND RECOMMENDATIONS

Identification of 12 local Papuan sweet potato genotypes showed clear diversity in agromorphological characteristics and tuber quality. Genotypes Numfor-01, Manokwari-01, Airani, and Tinta-01 ex-celled in vegetative growth, while Koya-4 had the potential to increase growing points through a greater number of branches. In terms of yield, genotypes Nabire, Local Sorong, and Numfor-01 pro-duced high productivity components. In terms of quality, genotype Manokwari-01 showed the highest dry matter content (or lowest moisture content), while Numfor-01 had the highest sweetness level. Based on the criteria for superior genotypes, namely high productivity and good tuber quality, geno-types Nabire, Numfor-01, and Local Sorong are worthy of consideration as potential candidates in breeding programs oriented towards increasing sweet potato production.

FURTHER STUDY

This research still has limitations, so it is necessary to conduct further research related to the topic of Agromorphological Characteristics and Tuber Quality of Several Local Papua Sweet Potato (Ipomoea Batatas L.) Genotypes in Prafi Mulya Village, Manokwari in order to perfect this research and increase insight for readers.

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REFERENCES

Allo, L. M. (2022, August 22). Kampung Prafi Mulya lumbung padi di Kabupaten Manokwari keku-rangan alat pertanian. Tribun Papua Barat. https://papuabarat.tribunnews.com/2022/08/22/kampung-prafi-mulya-lumbung-padi-di-Kabupaten-Manokwari

Alam, Z., Akter, S., Khan, M. A. H., Hossain, M. I., Amin, M. N., Biswas, A., Rahaman, E. H. M. S., Ali, M. A., Chanda, D., Rahman, M. H. S., Kawochara, M. A., Alam, M. S., Mollaa, M. M., Islam, M. M., Jahan, M. A. H. S., Prodhan, M. Z. H., Kadir, M. M., & Sarkera, D. (2024). Sweet potato (Ipomoea batatas L.) genotipe selection using advanced indices and statistical models: A multi-year approach. Heliyon, 10(10), e31569. https://doi.org/10.1016/j.heliyon.2024.e31569

Badan Pusat Statistik. (2016). Statistik tanaman pangan Indonesia 2015. Jakarta: BPS.

Dango, K. H., Gowda, V. B. S., Chauhan, M., Nedunchezhiyan, M., Pradeepika, C., Senthilkumar, K. M., Chandra, V., Byju, G., Sahoo, M. R., Pati, K., & Arutselvan, R. (2025). Genotipe × en-vironment interaction analysis and simultaneous selection using AMMI, BLUP, GGE biplot and MTSI under drought condition in sweet potato. Journal of Soil Science and Plant Nutrition, 25, 3797–3814. https://doi.org/10.1007/s42729-025-01789-3

Demelie, M., & Aragaw, A. (2016). Genetic variability of sweet potato on yield and yield related traits at Werer Agricultural Research Center, Ethiopia. Electronic Journal of Plant Breeding, 7(2), 326–370. https://doi.org/10.5958/0975-928X.2016.00046.1

Fitria, E., Hanum, F., Syahputra, R., & Jayanti, N. (2021). Pemanfaatan ubijalar sebagai pemasukan pendapatan bagi ibu-ibu di Desa Kampung Baru. Jurnal Pengabdian Masyarakat Gemilang (JPMG), 1(2), 58–65.

Ginting, W. A. P., Ginting, J., & Rahmawati, N. (2017). Respon pertumbuhan dan produksi ubijalar ungu terhadap pemberian berbagai dosis bokashi jerami padi. Jurnal Agroekoteknologi, 5(1), 233–239.

Gomez, K. A., & Gomez, A. A. (1984). Statistical procedures for agricultural research (2nd ed.). New York: John Wiley & Sons.

Hamzah, M. F. (2010). Studi morfologi dan anatomi daun edelweis Jawa (Anaphalis javanica) pada zona ketinggian yang berbeda di taman. Skripsi, UIN Malang.

Hapsari, H., Rasmikayati, E., & Saefudin, B. R. (2019). Karakteristik petani dan profil usahatani ubi-jalar di Kecamatan Arjasari, Kabupaten Bandung. Sosiohumaniora, 21(3), 247–255.

Hejjegar, I., Hiremath, S. M., Naik, K. R., & Kolur, S. M. (2023). Genetic variability, heritability and genetic advance in sweet potato (Ipomoea batatas L.) genotipes. International Journal of Envi-ronment and Climate Change, 13(9), 2791–2797. https://doi.org/10.9734/IJECC/2023/v13i92513

Huamán, Z. (1991). Descriptors for Sweet Potato. CIP, AVEDC, IBPGR. Internasional Board for Plant Genetic Resources. Roma, Italy.

Jaywant, S. A., Singh, H., & Arif, K. M. (2022). Sensors and instruments for Brix measurement: A review. Sensors, 22(6), 2290. https://doi.org/10.3390/s22062290

Jung, J.K. Lee, S.U. Kozukue, N. Levin, C.E. Friedman, M. 2011. *Distribution of Phenolic Compounds and Antioxidative Activities in Parts of Sweet Potato (Ipomoea batata L.)* Plants and in Home Processed Roots. J. Food Compos. Anal, 24, 29–37.

Kar, D. S., Panda, C. M., Sahu, G. S., Tripathy, P., Das, A. K., Sahu, S., & Mohanty, A. (2022). As-sessment of growth and yield of sweet potato genotipes. International Journal of Environment and Climate Change, 12(11), 3650–3656.

Junior, A. D. S., Gomes, C. N., Albuquerque, D. P., et al. (2025). Estimation of genetic parameters and use of selection indices in the identification of superior sweet potato genotypes. Euphytica, 221(60). https://doi.org/10.1007/s10681-025-03513-8

Khalil, M.N. (2016). *Sehat Tanpa Obat Dengan Ubijalar*. Cetakan Pertama. Andi Publised. Jakarta.

Laveriano-Santos, E. P., López-Yerena, A., Jaime-Rodríguez, C., González-Coria, J., Lamuela-Raventós, R. M., Vallverdú-Queralt, A., Romanyà, J., & Pérez, M. (2022). Sweet potato is not simply an abundant food crop: A comprehensive review of its phytochemical constituents, bio-logical activities, and the effects of processing. Antioxidants, 11(9), 1648. https://doi.org/10.3390/antiox11091648

Lebot, V. (2009). *Tropical root and tuber crops: Cassava, sweet potato, yams and aroids.* Wallingford, UK: CABI Publishing.

Markam, A., Singh, S., & Patel, R. (2026). Genetic variability, heritability and genetic advance in sweet potato (Ipomoea batatas L.). International Journal of Current Microbiology and Applied Sciences, 15(3), 112–120.

Maulana, H., Dewayani, S., Solihin, M. A., Arifin, M., Amien, S., & Karuniawan, A. (2020). Yield stability dataset of new orange-fleshed sweet potato (Ipomoea batatas L.) genotipes in West Ja-va, Indonesia. Data in Brief, 32, 106297. https://doi.org/10.1016/j.dib.2020.106297

Mawikere, N. L., Prabawardani, S., Suparno, A., Taberima, S., Olludium, N., Warbaal, A., Wibawa-ti, Z., & Sulistyaningsih, L. D. (2025). Phylogenetic analysis of local Papuan (Indonesia) sweet potato genotipes using the maturase K (matK) molecular marker. Biodiversitas, 26(3), 1367–1375.

Merahabia, P. A., Prabawardani, S., Mawikere, L., & Linggi, M. I. A. (2025). Keragaman genotipe dan daya hasil ubi jalar (Ipomoea batatas L.) lokal asal Papua. IGYA SER HANJOP, 7(1), 1–11. https://doi.org/10.47039/ish.7.2025.1-11

Moorthy, S. N., Sajeev, M. S., & Shanavas, S. (2012). Sweet potato starch: Physico-chemical, functional, thermal and rheological characteristics. *Food, Vegetable, and Cereal Science and Biotechnology, 6*(Special Issue 1), 1–12. Central Tuber Crop Research Institute, India.

Paiki, A. (2024). Produktivitas, kadar nutrisi dan sifat sensori beberapa genotipe ubijalar (Ipomoea batatas L.) lokal Papua (Tesis). Program Pascasarjana, Universitas Papua, Manokwari.

Paiki, A., Prabawardani, S., Suparno, A., Mawikere, N. L., & Mbusango, A. (2024). Korelasi kadar air, bahan kering dan kadar gula serta sifat sensori umbi beberapa genotipe ubi jalar lokal Pa-pua. Cassowary, 7(2), 1–9. https://doi.org/10.30862/casssowary.cs.v7.i2.283

Pavithra, P., Thangamani, C., Pugalendhi, L., Swarnapriya, R., & Meenakshi, P. (2022). Studies on evaluation of sweet potato (Ipomoea batatas Lam.) genotypes for high tuber yield and quality. International Journal of Environment and Climate Change, 12(11), 1–12.

Pulungan, I., Siregar, L. A. M., & Ginting, S. (2016). Genotipe × environment interaction and stabil-ity analysis of sweet potato (Ipomoea batatas L.) genotipes. Journal of Agronomy Research, 4(2), 45–53.

Purbasari, K., & Sumadji, A. R. (2018). Studi variasi ubijalar (Ipomoea batatas L.) berdasarkan karak-ter morfologi di Kabupaten Ngawi. Jurnal Biologi, 5(2), 78–84.

Sani, I., Marsiti, C. I. R., & Masdarini, L. (2019). Studi eksperimen pengolahan brownies kukus ber-bahan baku tepung ubijalar ungu. Jurnal BOSAPARIS: Pendidikan Kesejahteraan Keluarga, 9(1), 67–75.

Shaumi, U., Chandria, W., Waluyo, B., & Karuniawan, A. (2011). Potensi genetik ubijalar unggulan hasil pemuliaan tanaman berdasarkan karakter morfo-agronomi. Dalam Tanaman Aneka Ka-cang dan Umbi: Prosiding Seminar Hasil Penelitian. Bogor: Pusat Penelitian dan Pengem-bangan Tanaman Pangan.

Sinon, J. Y., Mawikere, N. L., Prabawardani, S., Sarungallo, A. S., & Wibawati, Z. (2025). Keane-karagaman karakteristik morfologi beberapa aksesi ubi jalar yang dibudidayakan oleh masyara-kat Suku Irarutu dan Suku Dani di Kabupaten Kaimana. Cassowary, 9(1), 30–43.

Suparno, A., Prabawardani, S., & Pattikawa, A. B. (2016). The nutritional value of sweet potato tu-bers [Ipomoea batatas (L.) Lam.] consumed by infants and children of Dani Tribe in Kurulu District, Baliem-Jayawijaya. Journal of Agricultural Science, 8(3), 64–69. https://doi.org/10.5539/jas.v8n3p64

Vinod, D. V., Alam, S., Sharma, S., Barua, N. S., & Baishya, S. (2024). Estimation of genetic varia-bility and heritability for yield and its related components of orange fleshed sweet potato (Ipo-moea batatas L.) genotipes. International Journal of Advanced Biochemistry Research, 8(Special Issue 12), 1259–1263. https://doi.org/10.33545/26174693.2024.v8.i12Sp.3313

Wasti, T. Y., Mawikere, N. L., Prabawardani, S., Abbas, B., Wibawati, Z., Dare, D., & Moeljono, S. (2025). Eksplorasi dan deskripsi keanekaragaman morfologi aksesi ubi jalar (Ipomoea batatas L.) di Distrik Nabire dan Nabire Barat Kabupaten Nabire.

Woolfe, J. A. (1992). *Sweet potato: An untapped food resource.* Cambridge: Cambridge University Press.