



AGRO-MORPHOLOGICAL CHARACTERIZATION OF M₁V₃ GENERATIONS OF LOCAL TARO VARIETY (*Colocasia Esculenta* L. WANGI) MUTANT LINES



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ABSTRACT

Taro (*Colocasia esculenta* L.) is one of the major root food crops around the world which has great potential in terms of high-quality food and has a higher nutritive value. The improvement and selection of these crops require characterization using desirable morphological traits. An agro morphological characterization study was conducted at the experimental site of Malaysian Agricultural Research and Development Institute (MARDI), Serdang. The aim of this study is to describe the agro-morphological characterization of M₁V₃ generations of local taro variety (*Colocasia Esculenta* L cv Wangi) mutant lines. A total 323 accessions of taro were evaluated under field conditions to collect data on their agro-morphological characteristics for the development of the crop. Data were collected for 13 qualitative traits. A wide range of variations were observed among the 323 taro accessions based on agro-morphological characters. Result demonstrated that all taro accessions had semi- horizontal orientation leaves, shaped of leaf vein, leaf margin and sinus cut. Most accessions of Taro Wangi had flat shape of lamina (66.6%), green colour of lamina (48.6%) with purple vein colour (91.6%) and 30.7% of the taro recorded lamina variegation in leaves. For petiole trait, all taro accessions showed base white colour. A total of 73.1 % recorded light purple colour petiole and majority of them has variegation on the petiole (99.6%). Sixty- seven percent of the taro accessions had suckers compared to 32.3 % with no sucker. For stolon formation, 3.4% of the accessions had stolon while 96.6% shows no formation of stolon. From this study, it can be concluded that agro-morphological characterization was useful in identifying variations among the accessions however molecular studies are required to confirm and complement the current agro morphological variation.

INTRODUCTION

Colocasia esculenta (L.) or known as Taro is a significant root crops widely cultivated in tropical and subtropical areas belongs to the family Aracea. It is probably invented in Southeast Asia or southern Asia and believed to be one of the most primitive crops to be domesticated. It is mainly used as traditional root crop for its edible corms and leaves. The taro mucilage has a high carbohydrate content with a good sources of fiber and many vitamins and minerals. In Malaysia, taro is not considered as main staple foods due to consumption of rice is more common in this country. Therefore in Malaysia, the production of taro is lower compared to other crops. To improve the role of taro in providing staple food and income for taro socio-economic groups in Malaysia. For any effective work to be done on taro, it is important to know its morphological characteristics some local accessions of taro that found in Malaysia.

OBJECTIVES

- To determine the qualitative characteristics of taro germplasm using agro-morphological traits.

METHODOLOGY

Descriptors of taro developed by International Plant Genetic Resource Institute (IPGRI) were used for data collection.

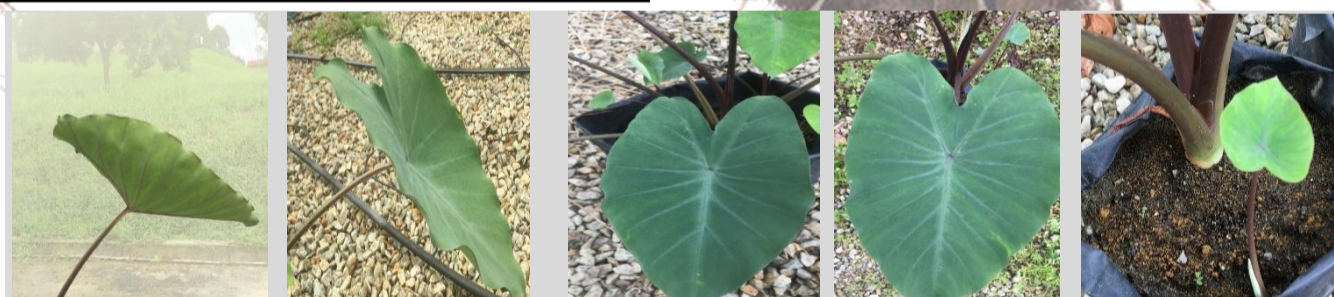
A total of 13 qualitative traits were used to characterize the taro accessions.

RESULT AND DISCUSSION

Qualitative trait	Description Adopted	No. of accessions	Frequency (%)
SHAPE OF LAMINAR	FLAT	215	66.6
	UP SHAPED	108	33.4
	SEMI HORIZONTAL	323	100
LAMINAR ORIENTATION	DOWNWARD	0	0
	DARK GREEN	16	5.0
COLOUR OF LAMINAR	GREEN	157	48.6
	LIGHT GREEN	147	45.5
	YELLOW	3	0.9
VEIN COLOUR	PURPLE	296	91.6
	GREEN	26	8.0
SHAPE OF LEAF VEIN	Y SHAPED	323	100
	V SHAPED	0	0
LAMINAR VARIEGATION	PRESENT	99	30.7
	ABSENT	224	69.3
LEAF MARGIN	Undulated narrow waves	323	100
	NARROW	0	0
SINUS CUT	WIDE	323	100

Qualitative trait	Description Adopted	No. of accessions	Frequency (%)
COLOUR OF PETIOLE	LIGHT PURPLE	236	73.1
	PURPLE	83	25.7
	GREEN	4	1.2
	LIGHT GREEN	0	0
BASE COLOUR	YELLOW GREEN	0	0
	BLACKISH	0	0
	WHITE	323	100
VARIEGATION	PURPLE RED	0	0
	PRESENT	322	99.6
	ABSENT	1	0.3

Qualitative trait	Description Adopted	No. of accessions	Frequency (%)
SUCKER FORMATION	PRESENT	219	67.8
	ABSENT	104	32.2
STOLON FORMATION	PRESENT	11	3.4
	ABSENT	312	96.6



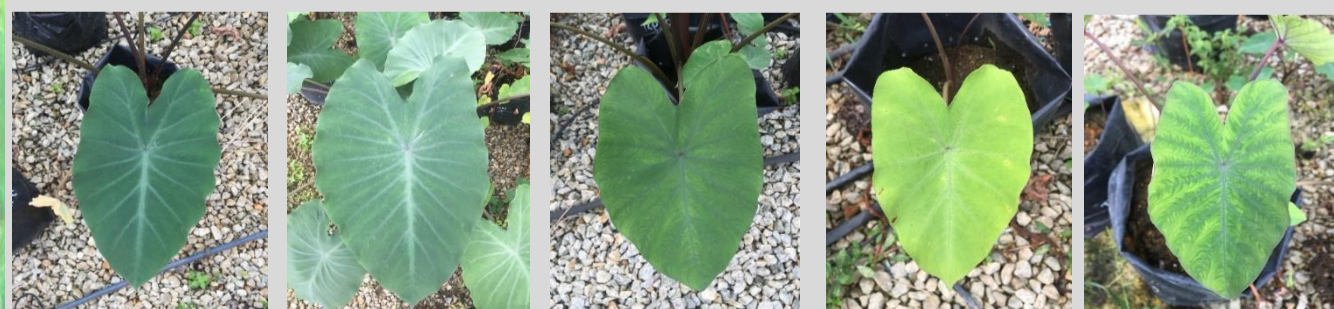
U-shaped

Flat shaped

Purple vein

Green vein

Sucker



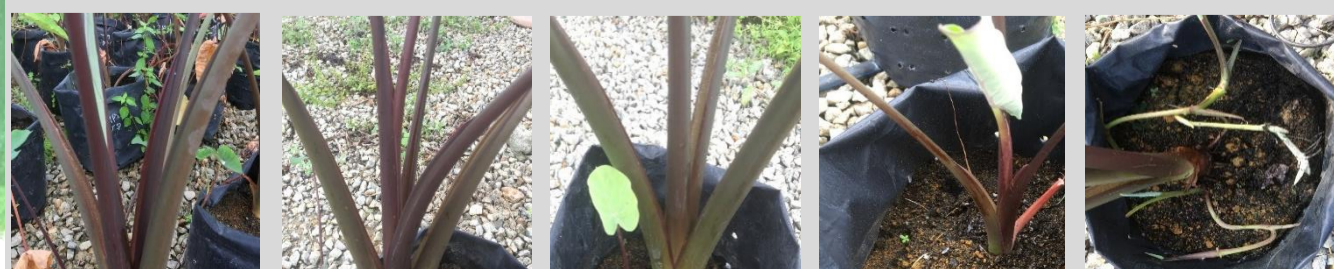
Dark green leaf

Green leaf

Light green leaf

Yellow leaf

Variegation leaf



Purple petiole

Light purple petiole

Green petiole

Variegation petiole

Stolon

REFERENCES

Boampong, R., Aboagye, L. M., Nyadanu, D., & Esilfie, M. (2018). Agro-morphological characterization of some taro (*Colocasia esculenta* (L.) Schott.) germplasms in Ghana. *Journal of Plant Breeding and Crop Science*, 10(8), 191-202.

Ouedraogo, N., Traore, R. E., Bationo-Kando, P., Sawadogo, M., & Zongo, J. D. (2018). Agro-morphological diversity of exotic taro varieties (*Colocasia esculenta* L. Schott) introduced in Burkina Faso. *Journal of Experimental Biology and Agricultural Sciences*, 6(2), 370-385.

BAMMITE, D., MATTHEWS, P. J., DAGNON, D. Y., AGBOGAN, A., KOMI, O. D. A. H., DANSI, A., & KOFFI, T. O. Z. O. (2018). Agro morphological characterization of taro (*Colocasia esculenta*) and yautia (*Xanthosoma mafaffa*) in Togo, West Africa. *African Journal of Agricultural Research*, 13(18), 934-945.

Beyene, T. M. (2013). Morpho-agronomical characterization of taro (*Colocasia esculenta*) accessions in Ethiopia. *Plant*, 1(1), 1-9.