



Macro Morphological Observations in Capsicum Varieties Cultivated in Awka Anambre State South Eastern Nigeria

Aziagba, Bibian.O., Okeke ,C.U. ,Ezeabara,Chinelo,A. .Ilodibia Chinyere .V. Uka, Chiedozie.J

Department of Botany, Nnamdi Azikiwe University, Awka.

*Corresponding Author: Aziagba, Bibian.O.

Abstract: Morphological observations were made on five varieties of Capsicum . This is with a view of establishing intra and interspecific relationship between the taxa. The result of the vegetative and floral morphology showed that there exist similarities in the habit ,leaf attributes of type, shape, arrangement, attachment, margin, base , leaf texture, leaf apex, colour, pedicel, and calyx colour while differences exists in leaf arrangement, height, leaf length ,leaf width ,petiole length, habit, floral arrangement, fruit shape, seed number, pod length ,pod width and pod colour. Vegetative and floral morphology observed strengthens the intra and interspecific relationship in the taxa. Thus macro morphological results obtained above alongside with other taxonomic differences in the taxa can be used to enhance proper understanding of the five varieties and in the genus Capsicum .

KEYWORDS: Taxonomy, Morphology, Capsicum annum, Capsicum frutescens.

INTRODUCTION

The genus, Capsicum belongs to the family Solanaceae (Night shade) members. Members of Solanaceae are mostly herbs or under shrubs while some others are climbers ¹ .The family contains about 90 genera and nearly 3000 species ² widespread in distribution. The genus consist approximately of 20-27 species³ five of which are domesticated which include the Capsicum annum, Capsicum. Baccatum, Capsicum chinense, Capsicum frutescens and Capsicum pubescens^{4, 5} they are grown mainly for home consumption but recently an increasing quantity is being exported ⁶ . In Nigeria, Capsicum species are rated third in importance among the cultivated vegetables ⁷ . They are dicotyledonous plant bearing berries with numerous seeds. Capsicum annum are herbaceous annual that can reach a height of 60cm and above, having glabrous or pubescent lanceolate leaves. It has white flowers and fruits that vary in length, colour and pungency, depending upon the cultivars. Capsicum annum include a large number of horticultural varieties and is about the most important economically. Fruit size, shapes and colour are extremely variable than in any other species. The fruit size varies in size from 1-30cm in length and from small conical to thick fleshy which include both pungent and non-pungent varieties ⁸ . Flattened yellow

Macro Morphological Observations in Capsicum ...

and green immature and red yellow and brown mature fruits are common pod colours found in *Capsicum annum*. *Capsicum frutescens* is widely cultivated in tropical and subtropical regions of the world also found in Agricultural varieties. The sizes of fruit and shapes are variable, but none have exceeded 10cm in length. This implies that they do not reach the size of *Capsicum annum*. The ease at which domesticated species in particular cross pollinate with each other and the active hybridization of new varieties often for marketing purposes, has resulted to a baffling range of varieties available making classification an increasingly difficult task thus the study of Phylogenetic relationships between species as revealed by researchers can be done using biogeographical⁹. morphological^{10,11,12}, genetic data among others *Capsicum* species mostly cultivated in southeastern Nigeria includes *C. annum* Var.'Atarugu', *C. annum* Var. 'Otuocha', *C. annum* Var.'Shombo' curl pepper, *C. annum* Var.'Nsukka yellow' and *C. frutescens* Var. Bird eye pepper. The use of vegetative and floral morphology in the systematic grouping, characterization and classification of different taxa is no more a new event. This is because this aspect of identifying plants has great value and enables correlation of characters to be easily determined. Leaf characters such as arrangement, type, form, duration and venation are widely use in both classification and identification of plants¹³. In using leaf characters in *Ulmus* and *Betula*, the species are delimited only on the bases of leaf characters¹.described that fruit characteristics are widely used in identification. He further indicated that fruit characteristics were only used in delimitation of species of the genus *Valerianella*. He also noted that seed characters were valuable in the identification of features in the genus *Veronica*, and in the construction of diagnostic keys in distinguishing species. Underground parts such as roots, tubers are also of taxonomic value in plants^{13, 14}. Used morphological features in recognition of two *Solanaceae* subfamilies of *solanoideae* and *cestroideae*¹⁵used vegetative and floral characteristics to classify some species of *Dioscorea* In a similar way¹⁶ used morphological characters in the characterization of *Maesobotrya*, *barteri* var *bateri*. Furthermore¹⁷ did similar work in eight *Vigna* species. In etnomedicine, their leaves and fruits contains secondary metabolites which are used in treatment of various ailments especially in cancer patients. Despite the numerous economic and agronomic importance of this genus, there is absence of clear taxonomic criteria especially in the morphological characters these species. Hence, this study investigates the macro morphological features of *capsicum* varieties for accurate identification and description of the varieties.

MATERIAL AND METHODS

Morphological studies were made on fresh samples of the five varieties under study. The collection of samples were from the experimental garden at Nnamdi Azikiwe University Awka. This was from the third leaf (from the top randomly) from all the varieties using a secateurs. The length and width of the leaves were measured using a 30cm meter rule. This was done by spreading the

middle leaflet on a flat surface on the bench in the laboratory. For the width, the same median leaflet was chosen to avoid being biased.

RESULTS

MORPHOLOGICAL RESULTS

Table 1. The results of the morphological characters of the five varieties

CHARACTERISTIC S VEGETATIVE MORPHOLOGY	TAXA				
	CAPSICUM ANNUM VAR.NSUKE A YELLOW PEPPER	CAPSICUM FRUTESCENS VAR.AFRICA N BIRD PEPPER	CAPSICUM ANNUM VAR.CAYENN E SHOMBO CURL	CAPSICUM ANNUM VAR.ATARUG U	CAPSICUM ANNUM var.OTUOCH A PEPPER
Habit	Annual herb	Perennial herb	Annual herb	Annual herb	Annual herb
Stem type	Erect branched from base	Erect branched from base	Erect branched from base	Erect branched from base	Erect branched from base
Colour	Green	Green	Green	Green	Green
Bark	Smooth	Smooth	Smooth	Smooth	Smooth
Leaf texture	Smooth	Smooth	Smooth	Smooth	Smooth
Leaf arrangement	Alternate	Opposite	Alternate	Alternate	Alternate
Leaf shape	Ovate	Ovate	Ovate	Ovate	Ovate
Leaf apex	Mucronate	Mucronate	Mucronate	Mucronate	Mucronate
Leaf base	Round	Round	Round	Round	Round
Leaf type	Simple	Simple	Simple	Simple	Simple
Leaf length(cm)	9.9cm	5.4cm	8.8cm	9.8cm	9.9cm
Leaf width(cm)	4.9cm	4.2cm	5.0cm	4.8cm	4.6cm
Table 1b FLORAL MORPHOLOGY					
FLOWER TYPE	Auxillary cyme	Auxillary cyme	Auxillary cyme	Auxillary cyme	Auxillary cyme
Floral arrangement	Opposite	Alternate	Opposite	Opposite	Opposite
Pedicle	Erect	Erect	Erect	Erect	Erect
Fruit shape	Ovoid	Linear	Linear	Ovoid	Ovoid
Seed number	4-6	6-8	6-10	4-6	4-7
Pod length (cm)	1.5cm	1.3cm	2.8cm	1.6cm	1.4cm
Pod width(cm)	2.7cm	0.15cm	2.6cm	2.7cm	2.5cm
Calyx colour	Greenish	Greenish	Greenish	Greenish	Greenish
Shape	Elliptic	Elliptic	Elliptic	Elliptic	Elliptic
Fruit shape	Pod	Pod	Pod	Pod	Pod
Pod colour	Yellow	Red	Red	Red	red

DISCUSSION

Macro Morphological Observations in Capsicum ...

The results of the morphological features of the five varieties studied show some specific characteristics that can be used for taxonomic decision. The variation in habit, height, leaf characteristics that can be used for taxonomic decision. The variation in habit, height, leaf arrangement,, leaf length and width, fruit shape,seed number,pod length,pod width,pod colour (Table 1 a and 1 b) of the varieties studied constitutes an important distinguishing factor that could be used for establishing intra and interspecific relationship. Capsicum can vary tremendously in colour, shape, and size both between and within species, which has led to confusion over the relationships between taxa ¹⁰. The stem is herbaceous and erect; leaves are alternate but opposite in floral region, simple and exstipulate. The fruit types are usually classified by fruit characteristics based on the colour, shape, flavour, and size and use ¹⁸ Leaf length, width leaf, pod length.pod width, fruit colour and, seed number between the varieties and also variation in habit and leaf arrangement between the varieties. This confirms the works of earlier research findings of; ^{19, 20, 21} who used morphological variations in taxonomic characterization of plants. Despite their numerous differences, the two species show similarities in some respects such as habit, leaf type, arrangement, floral symmetry, fruit shape, pedicel etc.as shown in Table 1, this is in line with the work of Nwachukwu and Edeoga ¹⁷ who used floral similarities in the genus Indigofera in establishing intraspecific relationship among species. Morphological features observed in this study are seasonably constant in the taxa, signifying the stability and differences in their morphological characters²¹.made similar observations in his study on the morphology of the genus Capsicum. The results of the floral and vegetative morphology of the five varieties of Capsicum studied have proved to be of immense assistance in interpreting problems related to plant classification. The results could therefore be utilized with information from other discipline in clarifying taxonomic relationships of these taxa with other genera, species or subspecies.

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