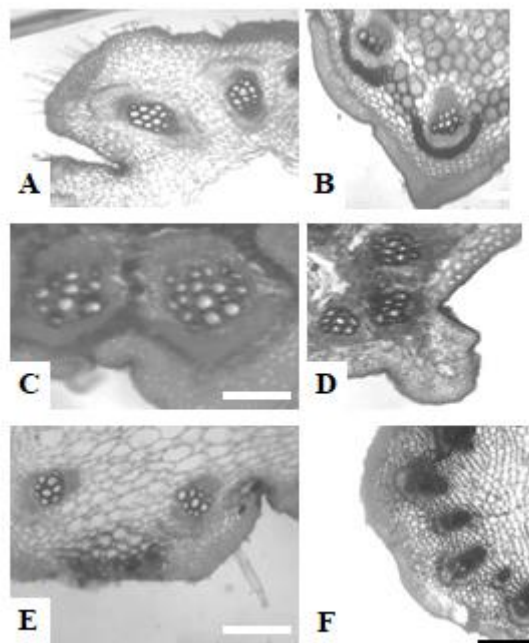




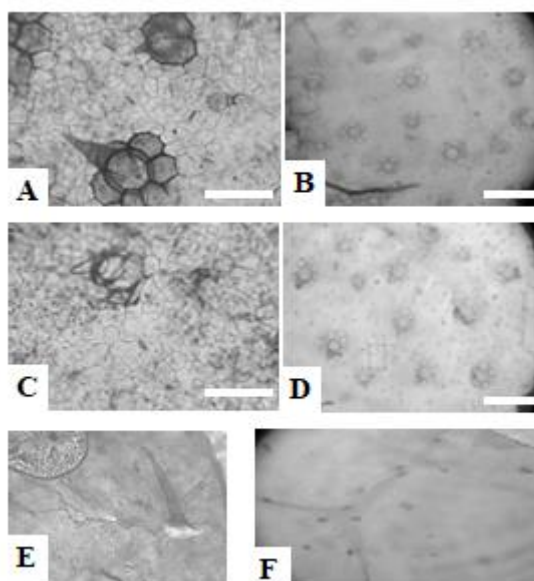


plates varied from species to species [38-40]. In *Cucurbita pepo*, they can be up to 10; *Lagenaria braviflora* up to 9; *Luffa cylindrica* and *Momordica cissoides* both have up to 8; *Citrullus colocythes* has up to 7; while in up to 14 were recorded in *Telfairia occidentalis* (Figures 1-3) (Table 1,2).

**Figure 1.** Photomicrographs of petiole in the family cucurbitaceae. (a) *C. pepo* (b) *Lagenaria breviflora*.(c) *L. cylindrica*.(d) *Momordica cissoides*.(e) *C. colocynthis*.(f) *Telfairia occidentalis*



**Figure 2.** Photomicrograph of leaf surface of (a) *Lagenaria breviflora* adaxial showing trichomes with cone base. (b) abaxial of *L.breviflora*.(c) abaxial of *C. colocynthis*. (d) adaxial of *C. colocynthis* with presence of both trichomes and trichomes base. (e,f) *Momordica cissoides* abaxial surface showing a trichomes and adaxial.



**Figure 3.** Photomicrographs of leaf surfaces in cucurbitaceae. (a) showing the adaxial of *Telfairia occidentalis* (b) abaxial of *Telfairia occidentalis*.(c) Adaxial of *Luffa cylindrica* showing long trichomes with base. (d) Abaxial of *Luffa*

cylindrical (e). Photomicrograph of leaf surfaces on *Cucurbita pepo*. showing the abaxial of *C. pepo* with trichome base. (f) Showing the adaxial of *C. pepo* with thin trichomes.

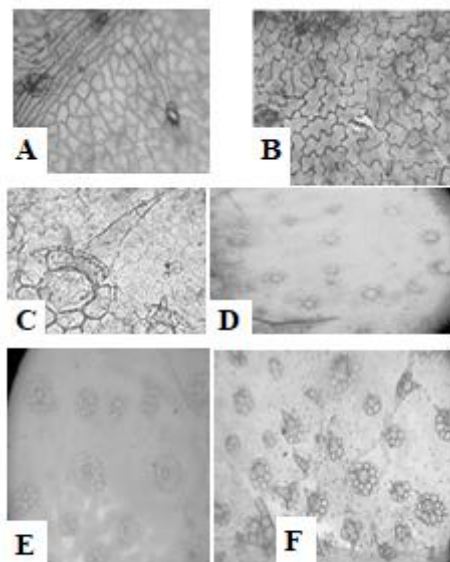


Table 1. Summary of the anatomical features of the Petiole of the studied species.

Plant part	Species						
	Features	<i>Cucurbita Pepo</i>	<i>Lagenaria breviflora</i>	<i>Luffa cylindrica</i>	<i>Momordica cissoids</i>	<i>Citrillus colocythes</i>	<i>Telfiaria occidentalis</i>
Petiole	Number of vascular bundles	10 plates	9 plates	7 plates	8 plates	7 plates	13 plates
	Trichomes Presen/absent	Present	Absent	Present	Absent	Present	Absent
	Trichomes type	Unicellular multiserate	Absent	Uniserate		Uniserate	Absent
	Sclerenchyma	3 cell layers	2 cell layers	3-4cell layers	3-4 cell layers	2 cell layers	1-2 cell layers
	Parenchyma	Present	1-2 layers	1-2 layers	Present	1-3layers	Present
	Collenchyma	2 cell layers	1-2 cell layers	2 layers	1-2 layers k	1-2-cellayers	2 cell layers

Table 2. Summary of leaf epidermal of the studied species.

Features	Species					
	<i>Cucurbita Pepo</i>	<i>Lagenaria breviflora</i>	<i>Luffa cylindrical</i>	<i>Momordica cissoids</i>	<i>Citrullus colocythis</i>	<i>Telfiaria occidentalis</i>
Trichomes type	Multicellular	Unisrate	Uniserate	Multicellular	Uniserate	Unicellular multiserate
Cell shape	Polygonal	Polygonal	Polygonal	Polygonal	Polygonal	Regular
Crystal/cell inclusion	Present	Present	Absent	Present	Absent	Present

The taxonomic relevance of anatomical characters of six phylogenetically related species in *Cucurbitaceae* is substantiated with features of leaf epidermis and petioles [41-45]. The trichomes found in the six studied species are uniseriate eglandular (modified basal cell) form. Glandular trichomes with a 4-celled head were identified in *Cucurbita pepo* while only unicellular multiseriate trichomes were observed in *Telfairia occidentalis*. Comparatively, unicellular multiseriate trichomes were found in both species but the ones in *Cucurbita pepo* are short and thick, while the ones found in *Luffa cylindrica* are long and thin [46-50]. This is consistent with the different types of glandular and eglandular trichomes that have been studied and described in cucurbits. Variations were also observed in the shape of the epidermal cells. The abaxial cells are irregular, wavy or crenulated while the adaxial cells are more regular in shape. The measurable characters such as epidermal cell size and trichome length overlap significantly, this reflect the infra-familial closeness of the studied species and their distinct grouping in the family *Cucurbitaceae*. Measurable characters have been employed by other workers for taxonomic interpretations. However, in the petioles, the ground tissues conform to the existence order but the vascular bundle plates number varied from 7-14 across the species. The variation can be combined with other data for species delimitation and understanding of affinity in the family. *Luffa cylindrica* and *Momordica cissoides* do not have more than 8 vascular bundle plates whereas other species do. Based on these features, an indented dichotomous key is prepared for delimiting the six species [51-54].

## CONCLUSION

Morphology of plants is an important factor used in making useful taxonomic conclusion about plants but it cannot be solely used. Anatomical feature is also of great importance in taxonomy since they are less affected by environmental factors. In this study, the vascular system of the petiole, the presence of different types of trichomes is all diagnostic. The diagnostic features of the petioles of the six species in different genera belonging to the family *Cucurbitaceae* include the presence of bicollateral vascular bundles and arrangement of the vascular bundles in the rows. However, these features can be used in combination with one another and other separate characters for enhanced identification of the species.

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