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Studies on Morpho-Anatomical Characteristics of *Synedrella nodiflora* (L.) Gaertn. A Member of Asteraceae

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ABSTRACT

***Synedrella nodiflora* is a common weed of the Niger Delta tropical and semi tropical regions useful in tradomedicine. This research studied the taxonomic characteristics of *Synedrella nodiflora*. The stem is erect, sometimes prostrate, branched and hairy. The petiolate leaves are simple ovate with opposite phyllotaxy having serrated margins measuring up to 13±2cm long and 8±3cm wide, attaining to about 70±12cm in height with acute apex. The inflorescences are terminal axillary clusters with yellowish florets. Epidermal study revealed anomocytic stomata which is amphistomatic in nature. Anatomical study showed a layer of epidermal cells. The hypodermis is made of 2 to 3 rolls of collenchyma while the general cortex consist of 4 to 5 rolls of parenchyma which occupied the pith also in the same pattern of occurrence in mid-ribs, petioles, stems, nodes and roots and vasculation is open type. The information generated here would further assist in the delimitation of the plant.**

INTRODUCTION

Synedrella nodiflora belong to Asteraceae, it is commonly known as synedrella, starwort or nodeweed (Akobundu and Agyakwa, 1998). Asteraceae is made of about 25,000 species belonging to about 1,500 genera (Souza and Lorenzi, 2012). *Synedrella nodiflora* is usually found growing around houses and moist, fertile and very illuminous regions (Stone, 1970; Swarbrick, 1997). In the family Asteraceae, there exist considerable anatomical diversity which is as a result of their ecological specialization and these features manifest in their occurrence in diverse habitats as in presence of secretory structures, varying vascular bundles, secretory

cells directly associated with the phloem, are of great taxonomical interest and their restricted distribution has an important diagnostic value (Metcalfe and Chalk, 1950; Fahn, 1979; Solereder, 1908; Makbul *et al*., 2011). (Ekeke and Mensah, 2016; Noorbakhsh *et al*., 2008) mentioned differences in their mid-rib shape used to classify members of the family. There are presence of non-glandular trichomes (Folorunso and Awosode, 2013; Rahman *et al*., 2013; Mabel *et al*., 2014). The differentiation of trichomes is genetically controlled and their frequency affected by environmental factors, both abiotic and biotic components (Werker, 2000).

The justification is to add more information to existing knowledge on the taxonomic characteristics of *Synedrella nodiflora*. Thus the objectives: 'Studies on Morpho-Anatomical characteristics of *Synedrella nodiflora* (L.) Gaertn. a member of Asteraceae.'

MATERIALS AND METHODS

Geographic Location

The location of the parent plant studied was Port Harcourt, Rivers, Nigeria.

Morphological Studies

The meter rule was used to confirm the plant height, leaf length and width etc.

Micro-morphological (Epidermal) Studies

Fresh leaves and young stem collected for this study were peeled and subjected to alcohol solutions in the ratio of 50%, 75% and absolute alcohol respectively. The cleared epidermal layers obtained were stained with safranin for 5 minutes washed and counter stained with Alcian blue for same time interval, washed and temporarily mounted in aqueous glycerol solution. Photomicrographs were taken from good preparations. The stomatal index (S.I.) was obtained using the formula:

$$S.I. = \frac{S}{S+E} \times \frac{100}{1}$$

Where *S* and *E* are mean numbers of stomata and epidermal cells respectively within the particular area under investigation. Likewise trichome Index (T.I) was obtained using:

$$T.I. = \frac{T}{T+E} \times \frac{100}{1}$$

Where T and E are trichomes and epidermal cells respectively within the study area.

Anatomical Study

The plants were harvested from the wild for the secondary anatomy. The harvested stems, leaves, petioles, flowers, fruits and roots were dehydrated in alcohol solutions of 50%, 75%, absolute alcohol and thereafter subjected through alcohol chloroform series in the ratio of 3:1 of alcohol chloroform series, 1:1, 1:3 and pure chloroform respectively for five minutes in each. Then rehydrated following same procedure to 50% alcohol before staining with safranin for 2 to 5 minutes, counter stained with Alcian blue for same time interval. Free hand section was done using a systematic arrangement of 5 razor blades as described by Wahua (2020) was also adopted. Microphotographs were taken from good preparations using Sony camera of 7.2 Mega pixels having 2.411 LCD monitor and High sensitivity ISO 1250.

RESULT

Geographic Location Parent Plants

The geographic location of the parent plants were found and harvested in Community Primary School Choba, Obio-Akpor Local Government Area of Rivers State, Nigeria.

MORPHOLOGICAL STUDY

The morphological features of *Synedrella nodiflora* (L.) Gaertn. Revealed yellowish flower florets. Their stems are erect, sometimes prostrate, branched and hairy. The petiolate leaves are simple ovate with opposite phyllotaxy having serrated margins measuring up to 13±2cm long and 8±3cm wide, attaining to about 70±12cm in height for the former. The inflorescence is made of terminal axillary clusters Plate 1 and 2.

Plate 1: *Synedrella nodiflora* (L.) Gaert. 1b and 1c: Tap root system and flower heads of *S. nodiflora*

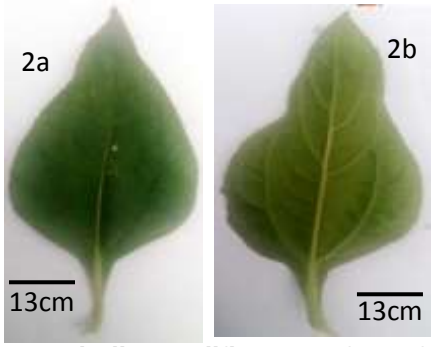

Plate 2: *Synedrella nodiflora* Leaf surfaces. 2a Adaxial (upper leaf) surface. 2b. Abaxial (Lower leaf) surface.

EPIDERMAL STUDY

Epidermal study revealed anomocytic stomata which is amphistomatic in nature. Anatomical study showed a layer of epidermal cells. Plates 3 and 4.

Plate 3: *S. nodiflora* abaxial foliar surface

Plate 4: *S. nodiflora* abaxial foliar surface

ANATOMICAL STUDY

The hypodermis which immediately followed after the epidermal layer is made up of 2 to 3 rolls of collenchyma. The general cortex comprises 4 to 5 rolls of parenchyma which also predominated the pith in the same pattern of occurrence in mid-ribs, petioles, stems, nodes and roots. Vasculation is open type. Plates 5a, 5b, 5c, 5d and 5e.

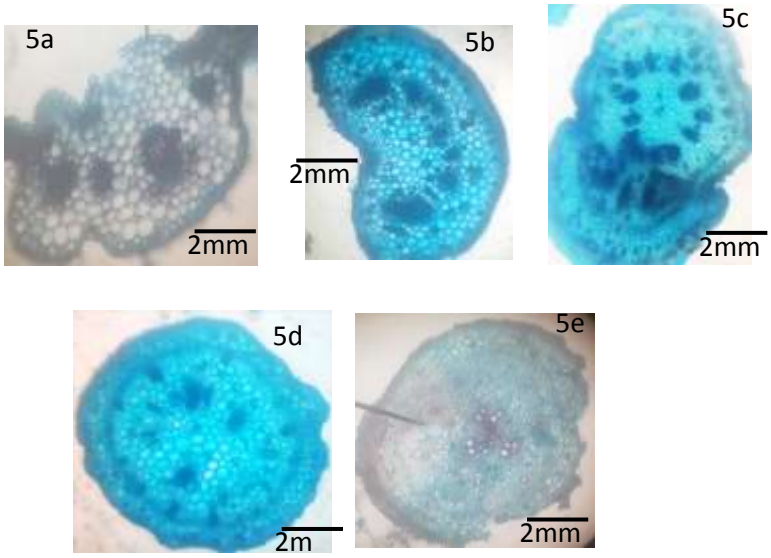

Figure 5: Anatomy of *Synedrella nodiflora.* 8a: Mid-rib, 8b: Petiole, 8c: Node, 8d: Stem 8e: Root.

DISCUSSION

Observation of secretory structures in mid-ribs, petioles and stem with vary vascular structures and this agrees to the work done by Metcalfe and Chalk, 1950; Fahn, 1979; Solereder, 1908 and Makbul *et al*., 2011). There are presence of non-glandular trichomes as also revealed by (Folorunso and Awosode, 2013; Rahman *et al*. 2013; Mabel *et al*. 2014). The number of vascular bundles from parent plants harvested from different distant places may vary to some extent, due to effects of environmental diversity, this agreed with the work of Ekeke and Mensah (2016), and Noorbakhsh *et al*. (2008).

CONCLUSION

Synedrella nodiflora is useful in tradomedicine. Karyotypes, quantitative aspect of phytochemistry, proximate analysis and DNA barcodes may be essential area of future interest.

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