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A COMMENTARY ON THE HAIR-LIKE APPENDAGES (INDUMENTUM) OF THE LEAVES IN AFRICAN PUMPKIN, *CUCURBITA MAXIMA*

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Abstract

African forestry enterprises are plagued by many problems, one being the infestation of crops and vegetation by insects. One structural feature found in African pumpkin, the trichomes, have several advantages and disadvantages. However, this trait ensures that African pumpkin plantations thrive, creep and spread in breeding grounds across the world. This paper is a succinct commentary on the hair-like appendages of the leaves in African pumpkin. Although it is specifically written for this plant species (i.e. *Cucurbita maxima*), perhaps, the same deductions can be made for the leaves of other pumpkin varieties.

Keywords: Trichomes, Epithelial, Filamentous, Protect, Abrasion, Water-resistant, Photosynthesis, Pollutants, Insects, Grow

The hair-like appendages of the leaves in African pumpkin, *Cucurbita maxima,* are known as trichomes. These appendages, like those in other pumpkin varieties overseas, have many advantages and disadvantages [1]. However, the latter is only deduced by means of making observations, as pumpkin seeds germinate and plantlets start to creep. The leaves of African pumpkin (like other varieties) are clove-like in shape, however, the tips appear to be pointed [1]. Emerging from the surface of the leaves, or the epithelial tissue of them, are thin filamentous structures [2]. These hair-like appendages are infiltrated with cytoplasm [2] which aid in them becoming a little rigid. Therefore, during a windy day, for example, the trichomes appear to be motionless [1]. The one main factor why they lack movement has to do with the fact that these appendages (indumentum) are borne from basal cells on the epithelium of the leaves [2]. Furthermore, they are enclosed by a thin membrane, which protrudes from a leaf [2]. A remarkable noteworthy attribute is that although the leaves of African pumpkin are big in size, the emergences of these epithelial appendages don't limit leaf growth [1]. This means that the leaf expansion theory, which is a trait of natural evolution overtime, is still evident in this plant species [3]. On a windy day, for example, it's observed that

although the leaves of the African pumpkin sway, the trichomes remain motionless [1]. This characteristic is because the trichomes in African pumpkin plantations are only visible under the microscope [2]. In the event of heavy rainfall, these hair-like appendages protect the leaves of African pumpkin from abrasion, and thus, it provides a breeding ground for insects, mites and other plant-loving creatures [3]. This means that the trichomes in African pumpkin are also a harmful trait, because the habouring of insects may cause leaf damage [1]. The latter occurs by insects feeding on plant matter, and as a result pumpkin plantations get ruined [1]. The trichomes in pumpkin are also shown as being a trait that allows leaves to be water-resistant [2]. This means that apart from the cuticle of the leaves in African pumpkin, the hair-like appendages provide additional water resistance. This implies a protective function of these trichomes in that it protects the internal structures of the leaves, thus, maintaining proper water homeostasis and the diffusion of CO_2 and O_2 into and out of the leaves [2,3]. This trait is important because the leaves have a large surface area and are thus affected by environmental pressures easily [1]. This means that photosynthesis and dark respiration can occur at an optimum, with leaf rubisco content being maintained at an optimum, as in the case of mesophytes [1]. An important observation on these hair-like appendages in African pumpkin leaves is that they are short and pointed [1]. This is an advantage since it indicates that insects would most likely be afraid to sit on the leaves, as trichomes may cause mechanical injury to them [3,4]. However, some insects that have a tough exoskeleton have been found chewing on the leaves in African pumpkin, thus indicating the lack of some use of these hair-like appendages [1]. The viscous nature of these trichomes, together with the nucleus of the plant cell, enables optimum leaf gas exchange to take place in African pumpkin plantations [1]. Furthermore, this function is afforded by there being little or no room on African pumpkin leaves to house environment pollutants, like sand and dust [1]. This enables African pumpkin plants to creep, grow and bear fruit, in spite of having this structure that sometimes is an advantage, or disadvantage, in natural forestry enterprises; like in farms for example.

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