

Aberrant types of leaf of *Quassia amara* Linn. and the question of validity of unifoliate compound leaf

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Abstract

The aberrant types of leaf of *Quassia amara* Linn. were studied. It is concluded that the aberrant unifoliate form arises by reduction of lateral leaflets and the question of the unifoliate compound leaves is discussed.

INTRODUCTION

The unifoliate compound leaf has been recognised on the basis of the presence of an articulation at the base of the lamina, which represents the position of other leaflets those have been eliminated in the course of evolution and the winged basal part is considered to be the petiole (1). The existence of an articulation at the base of lamina of *Citrus* leaf of the family *Rutaceae* is an evidence for such a concept of unifoliate compound leaf. But the anatomical studies of the petiole, lamina and the region near the articulation reveal that much emphasis has been given to the articulation and in fact, the leaf of *Citrus* is a simple leaf and the winged structure is nothing but a winged petiole (2 and 3).

The family *Simaroubaceae* is closely related to *Rutaceae* and both the families belong to the order *Rutales* (4 and 5). *Quassia amara* Linn. of the family *Simaroubaceae* has pinnate compound leaf with peculiar winglike expansions in the part of rachis between pair of leaflets and also at the base of the leaf. Abnormal forms of leaves are available in the same plant which on analysis may reflect some light on the question of validity of unifoliate compound leaf, like the leaf of *Citrus*. Such abnormal leaves have been obtained from different plants from different localities in West Bengal.

OBSERVATION

In *Q. amara*, often different types of leaves are available (Fig. 1, a-h) which show the stages of formation of simple leaf blade by gradual loss of leaflets and fusion of the surviving pairs. Loss of one or both of the upper lateral leaflets is evident in 1 b and 1 c. Though only the terminal leaflet remains together with the lower lateral pair of leaflets, the wing-like lateral expansion of the rachis is still present (1c). That the winged part of the rachis is nothing but a part of the incised lamina becomes evident from the form 1d where there is no distinct winglike part at the base of the surviving terminal leaflet but the sign of incision is still present. Form of leaf is also on record where the presence of three leaflets are evident but the terminal leaflet is incompletely fused with one of the

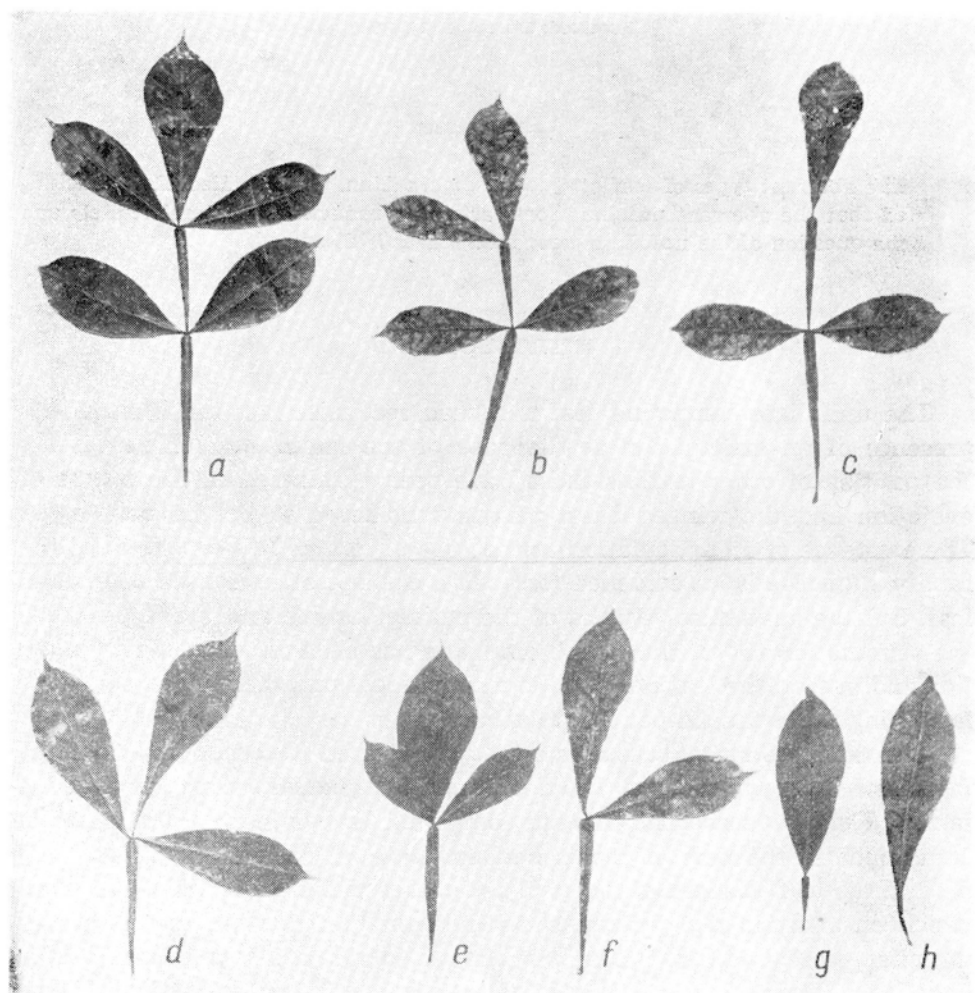


Fig. 1. Different aberrant types of leaf of *Quassia amara* Linn.

lateral pair (1e). In the next stage of elimination of leaflets, only the terminal leaflet and one of the lateral pair remain (1f). With the elimination of the remaining lateral leaflet, only the terminal one remains together with the winged basal part (1g). The winged basal part, so, is decidedly a part of the lamina and not a winged petiole because in other form (1h), the leaf shows a simple leaf blade.

DISCUSSION

From the developmental point of view, the origin of compound leaf is due to restriction of the laminar growth at certain intervals, around the main veins, both median and laterals (6). In other word, a simple leaf gets incised through developmental process to form a compound leaf. In *Q. amara* these intervals are separated by the parts of rachis which possess some limited laminar growth (1a) and for this reason the basal winglike structure is also a part of lamina having very limited growth. The pattern of laminar development in this plant is not very stable and aberrant forms are frequently available which show a tendency to revert to the original simple condition of leaf due to uniform laminar growth around the midrib. In the different forms restriction in the development of some or other lateral leaflets is observed resulting in their elimination. Absence of the differentiation of the lamina and the winged basal part, as well as fusion between the leaflets are also common. The necessary conclusion may be, therefore, that a simple leaf by restricted laminar growth around the rachis developed into a pinnate compound leaf and by elimination of all the leaflets except the terminal one, rather by uniform laminar growth throughout the length of the midrib, a simple leaf blade with a winged basal part may develop. This condition resembles that in *Citrus* leaf and the winglike part at the base of the lamina is an underdeveloped segment of the lamina and a constriction is left between these two parts.

The question may arise whether a simple lamina having a winglike basal part is to be considered as a unifoliate compound leaf. The transitional form of *Q. amara*, from a pinnate compound leaf to a form of simple leaf suggest that such condition may be termed as unifoliate compound leaf because it has developed by elimination of other leaflets of a compound leaf. Analysis from opposite direction may conclude that it is a condition of original simple type of lamina from which compound leaf has developed by restriction of laminar growth.

SUMMARY

Different abnormal types of compound leaf of *Quassia amara* Linn. have been studied among which a simple lamina with a winglike basal part is also present. This type of leaf resembles the leaf of *Citrus* sp. which is often referred as unifoliate

compound leaf. The validity of such unifoliate compound leaf has been analysed on the perspective of the structure of abnormal leaves of the plant under consideration.

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Odmienne typy liści Quassia amara Linn., a zagadnienie istnienia złożonych, jednolistkowych liści

Streszczenie

Badano różne okazy nietypowych ilości złożonych *Quassia amara* Linn., które w skrajnym wypadku posiadają postać jednolistkową, z oskrzydłą częścią podstawową. W oparciu o badanie występującej u tej rośliny zmienności liści wysuwane jest założenie, że niektóre typy jednolistkowych liści mogą pochodzić z liści złożonych.