Aliso: A Journal of Systematic and Floristic Botany

Volume 9 | Issue 3 Article 7

1979

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ALISO
9(3), 1979, pp. 481–482

BIOCHEMICAL PROFILE OF *APACHERIA CHIRICAHUENSIS* (CROSSOSOMATACEAE)

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Introduction

Apacheria C.T. Mason is a monotypic genus consisting of the single species *A. chiricahuensis* C.T. Mason. *Apacheria* was first described by Mason (1975) and was placed in the family Crossosomataceae based upon morphological, habitat, and pollen ultrastructural similarities to *Crossosoma bigelovii* Wats. Alternative systematic affiliations considered by Mason for this genus included Saxifragaceae and Rosaceae. Chemical investigations were initiated to test the accuracy of placement of this new genus in the family Crossosomataceae.

Materials and Methods

Dried plant materials for this investigation were generously supplied by Dr. C. T. Mason, Jr.

Analytical methods were the same as reported by Tatsuno and Scogin (1978) for studies of *Crossosoma*.

Results

The chemical constituents of *Apacheria chiricahuensis* are shown in Table 1. Also shown for comparison are the corresponding constituents from *Crossosoma* species reported by Tatsuno and Scogin (1978).

Flavonoid compounds (flavones and flavonols) are notably absent from the leaves and flowers of *Apacheria*, an unusual characteristic shared with both species of *Crossosoma*.

An anthocyanin pigment is present in minute amounts (clearly visible only under a dissecting microscope) in the sepals and adaxial petal surfaces of *Apacheria*. This pigment undergoes color changes in situ characteristic of anthocyanins when subjected to acidic and basic environments. The pigment occurs in such minute quantities that its presence was not noted in the original description of *Apacheria* flowers, which were described as white (Mason 1975). The pigment has been provisionally identified as cyanidin 3-glucoside. This identification is based upon a single R_f value in butanol-acetic acid-water (4:1:5) solvent with a crude, methanolic floral extract as sample. It would be necessary to denude the state of Arizona of this sparingly flowering species or await its successful cultivation before a sufficient amount of anthocyanin material could be available for complete characterization.

Table 1. Leaf (unless otherwise noted) constituents of *Apacheria* and *Crossosoma*.

	Apacheria	*Crossosoma*
Flavone/flavonol (leaf, floral)	–	–
Anthocyanin (floral)	+	+
Cyanidin 3-glucoside (floral)	+(?)	+
Proanthocyanidin	–	–
Caffeic acid	+	+
Gallic acid	tr	+
Ellagic acid	+	+
Ellagitannins (floral)	+	+
Syringin (stem)	–	±
Saponins (stem, bark)	–	–
Cyanogenic glycosides	–	–

Discussion

The phytochemical similarity between *Apacheria* and *Crossosoma* (see Table 1) leaves little doubt that *Apacheria* is properly placed in its alliance with the family Crossosomataceae. The most distinctive phytochemical features of *Crossosoma* (absence of leaf and floral flavonoids and presence of floral ellagitannins) are shared by *Apacheria* tissues, as are numerous additional chemical characteristics. Syringin was detected in stem tissue of *C. californicum* Nutt., but was not detectable in *C. bigelovii* or *A. chiricahuensis*. *Apacheria* is also more similar to *C. bigelovii* in features of morphology and habitat and this chemical feature could represent parallel evolution in a similar environment.

Recently a third genus, *Forsellesia,* has been included in the family Crossosomataceae (Thorne and Scogin 1978). *Apacheria* shares numerous morphological similarities with *Forsellesia* (stamen and ovule number, flower position, aril structure), but is very distinctive from *Forsellesia* in chemical constituents (Thorne and Scogin 1978). Conversely, while certain morphological features (notably opposite leaves in *Apacheria* and alternate leaves in *Crossosoma*) clearly discriminate *Apacheria* and *Crossosoma,* their chemistries are strikingly similar. These considerations give assurance that the three distinctive genera of the presently constituted Crossosomataceae are valid as three, coequal biological entities and are well-placed systematically.

Literature Cited

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