

Alkaloids from S. American species of *Uncaria* (Rubiaceae)

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The genus *Uncaria* has a pantropical distribution and is found mainly in S.E. Asia although it is also represented in mainland Asia, Africa and S. America. One of the two S. American species, *U. guianensis* (Aubl.) Gmel. is said to be used in folk-medicine in the treatment of intestinal ailments and in promoting wound healing (Ostendorf, 1962). The oxindole alkaloid rhynchophylline has been isolated from this species (Raymond-Hamet, 1952) but there are no other reports on its constituents, nor any on those of the other S. American species, *U. tomentosa* DC.

Both species were collected on recent expeditions to S. America and were made available to use for chemical investigation. The leaves and stems of each species yielded isorhynchophylline and rhynchophylline as the major alkaloids, together with their *N*-oxides, mitraphylline, dihydrocorynantheine, hirsutine and hirsuteine. In addition, *U. tomentosa* was found to contain isomitraphylline, its *N*-oxide and two new alkaloids which were identified as dihydrocorynantheine *N*-oxide and hirsutine *N*-oxide.

Another 14 samples of *U. guianensis* originating from widely separated regions of S. America were obtained from herbarium collections and screened for alkaloids. Of these, 12 resembled the above sample in their alkaloid content and one had the mitraphyllines as major alkaloids. Fewer collections of *U. tomentosa* have been made and only one herbarium sample was obtained for screening. Its alkaloid content was similar to the other sample except that the 9-hydroxy oxindoles isorotundifoline and rotundifoline were present as minor alkaloids.

Both the S. American species have morphological similarities to African and to Asiatic taxa. However, in their alkaloid content they are more closely allied to the Asiatic taxa (unpublished observations). The morphological and chemical affinities between the different geographical groups of species are of interest in the light of divergent theories as to the origin of the Asian, African and S. American continents (van Steenis, 1962; Tarling & Tarling, 1971).

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The chemotaxonomic significance of alkaloids in the Naucleaeae

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Some genera of the Rubiaceae (e.g. *Cinchona*, *Cephaelis*) are sources of medicinally important alkaloids. Members of the family produce alkaloids of three major types which although based on either quinoline (e.g. quinine), isoquinoline (e.g. emetine) or indole (e.g. yohimbine) ring systems, are related biosynthetically since all are partially derived from secologanin (Hegnauer, 1973). Oxindole and heteroyohimbine alkaloids are reported only from the tribes Cinchoneae and Naucleaeae in which the tribal delimitation has been debated (Bremekamp, 1966). The Naucleaeae in particular, are in a state of taxonomic confusion (Bakhuizen van den Brink, 1970) and are currently being revised. *Mitragyna* and *Uncaria*, traditionally