

CHAPTER IV

DISCUSSION

The majority of the alkaloids detected in *Uncaria* species are pentacyclic and tetracyclic heteroyohimbines, and the corresponding oxindoles. The closely related genus *Mitragyna*, which contains ten arboreal species, has been thoroughly examined for its alkaloids. There are some interesting points of difference between the alkaloidal contents of the two genera. Although 9-methoxy substituted heteroyohimbine and oxindole alkaloids are found in *Mitragyna* species and can be considered a common feature, no such substitution was found in the alkaloids of any of the *Uncaria* species. 9-Hydroxy substituted alkaloids are common in *Mitragyna* species but are rarely encountered in *Uncaria* species. No alkaloids having a C(19)-CH₃ β configuration in the pentacyclic heteroyohimbine and oxindole alkaloids have been isolated from species of *Mitragyna*, but they are present in some species of *Uncaria* although in relatively minor proportions compared with their C(19)-CH₃ α analogues. No obvious pattern was observed in the occurrence of either 9-hydroxy or C(19)-CH₃ β alkaloids within the genus *Uncaria*, but these difference from *Mitragyna* taken together with the apparent absence of 9-methoxy substitution may be of significance in that they appear to reflect differences in the enzyme systems involved in alkaloid biogenesis. Pyridino-indolo-quinolizidinones are found in both genera, however, the roxburghines, which are of extremely limited distribution, appear to be present only in *Uncaria*.

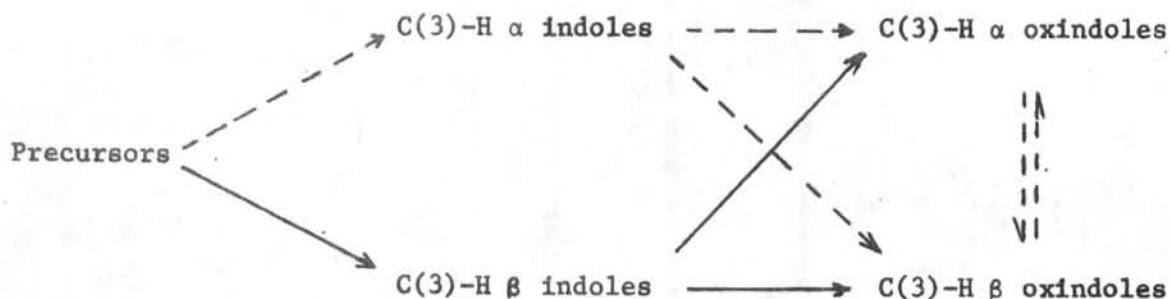
There are as many as 120 specific names of *Uncaria* in the Index Kewensis, and recently a world wide revision of this genus has been undertaken by Ridsdale (1978) and 34 species are now recognised. *Uncaria salaccensis* Bakh.f. nom provis has been regarded as a synonym of *U. attenuata* Korth. (Ridsdale, 1978) but in his more recent paper it is placed under *U. elliptica* R. Br. ex G. Don. There are reports of pentacyclic heteroyohimbine 3-isoajmalicine, and pentacyclic oxindoles mitraphylline and uncarine B in *U. attenuata* Korth. while roxburghines are reported to be usually present in *U. elliptica* R. Br. ex G. Don (Phillipson, Hemingway and Ridsdale, 1978).

When the presence and nature of alkaloids are used as taxonomic characters, it is assumed that their synthesis is genetically controlled and that particular alkaloids will accumulate in some taxa. However, environmental factors, for example, soil and climatic conditions, may influence the production of alkaloids and the types elaborated (Phillipson, Hemingway and Ridsdale, 1978). In the present work, 3-isoajmalicine, 19-epi-3-isoajmalicine, mitraphylline and uncarine B were isolated from the leaves of *U. salaccensis* Bakh.f. nom provis. According to the alkaloidal pattern, *U. salaccensis* Bakh.f. nom provis would seem more likely to be a synonym of *U. attenuata* Korth.

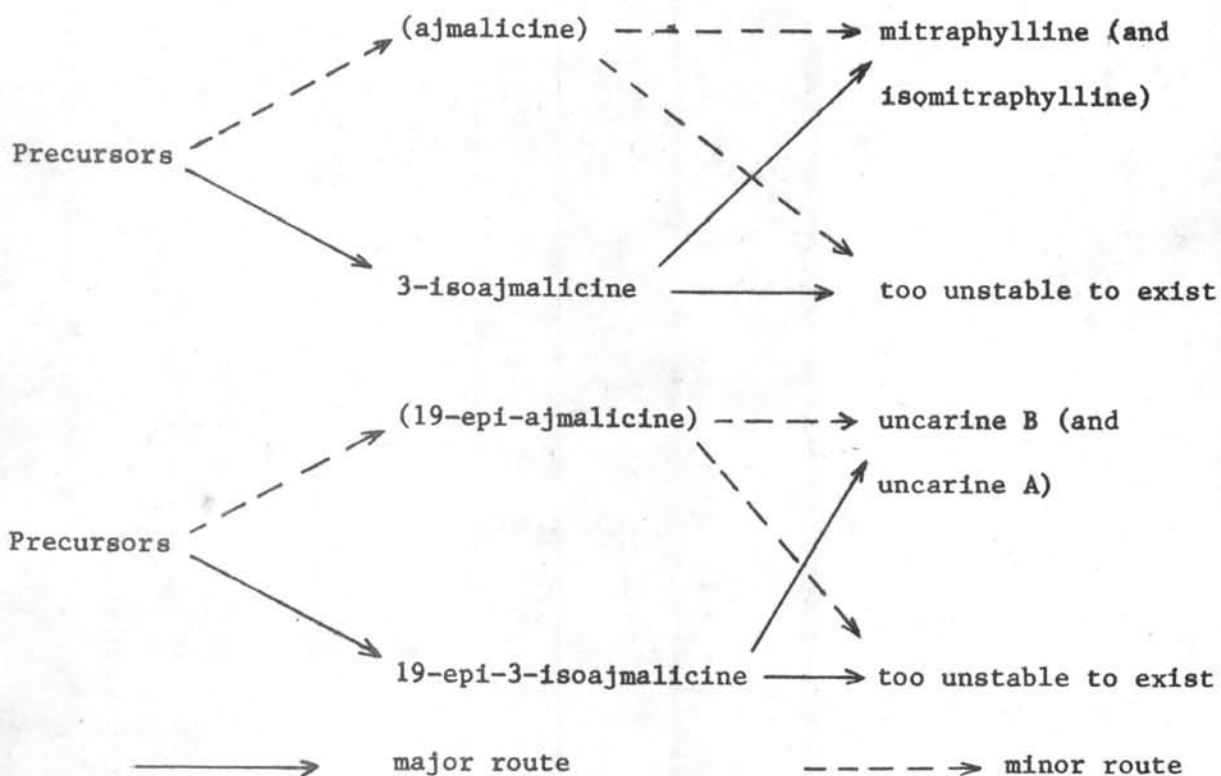
All of the isolated alkaloids from *U. salaccensis* Bakh.f. nom provis are pentacyclic alkaloids whose configurations are as follows:

3-isoajmalicine	<i>pseudo</i> ,	C(9)-H,	C(19)-CH ₃	α
19-epi-3-isoajmalicine	<i>pseudo</i> ,	C(9)-H,	C(19)-CH ₃	β
mitraphylline	<i>normal</i> B,	C(9)-H,	C(19)-CH ₃	α
uncarine B	<i>normal</i> B,	C(9)-H,	C(19)-CH ₃	β

According to the scheme for the biogenesis proposed by Shellard and Houghton (1974), i.e.:



the biogenetic patterns of *Uncaria salaccensis* Bakh. f. nom provis would be as follows:



However, the absence of other alkaloids still needs explanation and the fact that these alkaloids have not been detected might be due to three possibilities:

1. nearly all the indole alkaloids in question are isomerised to the corresponding oxindoles, so that at the most only traces of these alkaloids, too small to be detected in the quantities of material examined may be present,

2. a seasonal variation in the amount of isomerisation and conversion takes place so that leaves collected at different times of the year may show changes in the relative amounts of alkaloids present. This might also explain the absence of ajmalicine, 19-epi-ajmalicine, isomitraphylline and uncarine A, and

3. biogenesis does not take place in the leaves and only certain alkaloids are transferred from the site of biogenesis to the leaves and the amounts transferred vary from time to time.