CHAPTER IV

DISCUSSION

Among 34 species of the genus *Uncaria* over 40 alkaloids were isolated and identified. Some species, with different localities, environments, seasons and plant parts, show variations in the type of alkaloids present, but in other species the alkaloidal composition appears to be constant. From Ridsdale's recent revision the 34 *Uncaria* species are divided into 7 groups on the basis of morphological and anatomical characteristics. The majority of alkaloids reported were of the heteroyohimbine and oxindole types. The pentacyclic analogues are mainly found in groups II, IV and V, while the tetracyclic heteroyohimbines and oxindoles tend to predominate in groups I, III and VI.

In the closely related genus *Mitragyna*, which contains ten species, the 9-methoxy- and 9-hydroxy-substituted alkaloids have been found but in *Uncaria* species, the former have never been found, and the latter only rarely. No C-19 Meβ alkaloids in the pentacyclic heteroyohimbine and oxindole alkaloids have been isolated from *Mitragyna* species, but some have been found in *Uncaria* species. The roxburghines appear to be present only in *Uncaria* but pyridino-indolo-quinolizidinones are found in both genera.

Uncaria macrophylla Wall. is found, not only in Chiang Mai as originally recorded, but also in Nakorn-Rachasima which is in North-Eastern of Thailand. This species is constant in their alkaloidal content. The sample from several provinces of China, Laos and India

were found to have the same alkaloids, i.e., isorhynchophylline, rhynchophylline, corynoxine and corynoxine B. Only those from Assam, north-east of India, where unidentified indole alkaloid was detected and those from Laos, two other unidentified oxindoles were reported. In the present work the plants were collected while bearing young leaves, from Khao-Yai National park, Nakorn-Rachasima, Thailand in summer (March). The isolated alkaloids were identified as one heteroyohimbine, dihydrocorynantheine. and four oxindole alkaloids, the same as those having been reported. These alkaloids and their configurations can be summarised below :-

-dihydrocorynantheine (tetracyclic heteroyohimbine)

normal , R = H, R' = Et

-isorhynchophylline (tetracyclic oxindole)

normal A, R = H, R' = Et

-rhynchophylline (tetracyclic oxindole)

normal B, R = H, R' = Et

-corynoxine (tetracyclic oxindole)

allo A, R = H, R' = Et

-corynoxine B (tetracyclic oxindole)

allo B, R = H, R' = Et

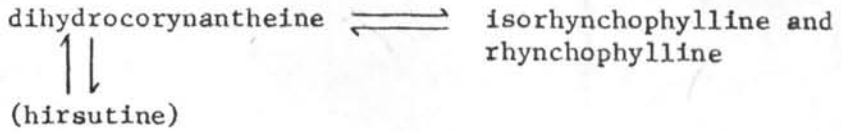
According to the scheme for the biogenesis suggested by Jackson and Smith (1968a), i.e. :

normal indoles $\rightleftharpoons$ *normal* oxindoles A and B

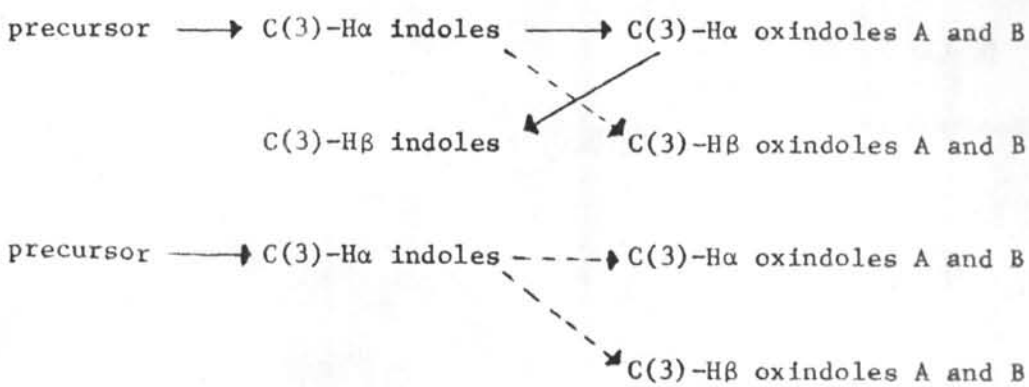
$\uparrow\downarrow$

pseudo indoles

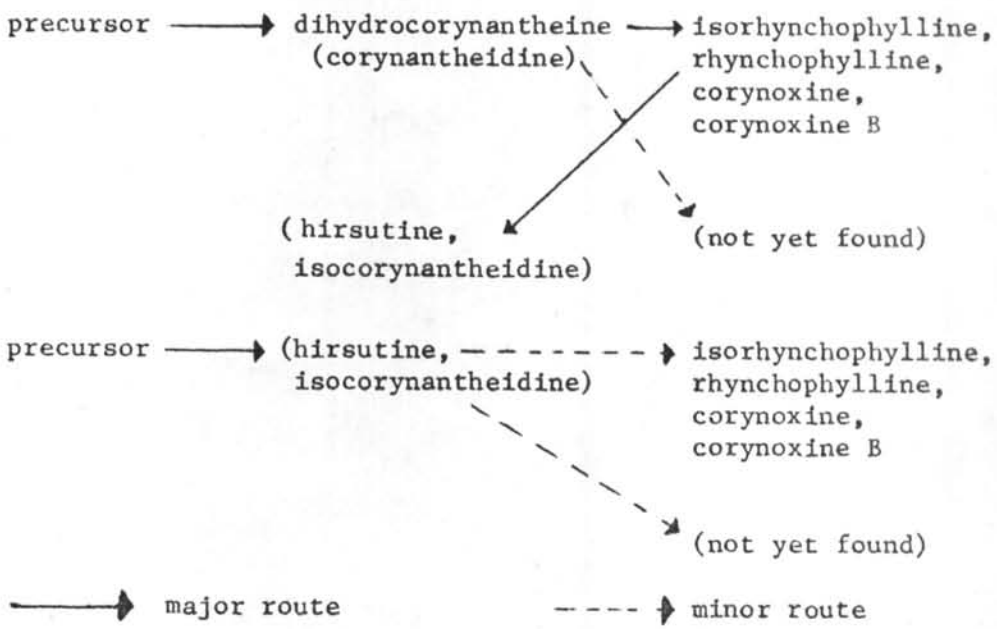
the biogenetic patterns of *Uncaria macrophylla* Wall. would be as follows :



According to Stockigt and Zenk (1977), the biogenetic scheme has been shown as below :



the biogenetic patterns of *U. macrophylla* Wall. would be as follows :



( ) = not yet isolated from *U. macrophylla* Wall.

From this biogenetic route, it can be assumed that the *normal* tetracyclic heteroyohimbine alkaloid, dihydrocorynantheine, might be synthesised first and then isomerised to *normal* tetracyclic oxindoles A and B, isorhynchophylline and rhynchophylline, and also the *allo* tetracyclic oxindoles A and B, corynoxine and corynoxine B. There is variation in the alkaloid content, i.e. the young leaves contain higher quantity of dihydrocorynantheine than the old leaves. This alkaloid might then presumably be synthesised first.

The absence of some indole alkaloids in the biogenetic pathway might be explained in three possibilities :

1. the absent indole alkaloids which have C(3)-Hβ configuration, i.e. hirsutine and isocorynantheidine are in the minor route of the pathway and most of these are isomerised and converted to oxindole alkaloids. Because of this, they might be present in too small the amount to be detected.

2. in different seasons, plants synthesise, isomerise and convert alkaloids in different way so the alkaloids isolated from plants collected at different times of the year may show variations.

3. the synthesis and biogenesis do not take place in the leaves, only the main alkaloids are transferred to the leaves.