CHAPTER IV

DISCUSSION

Mitragyna rotundifolia (Roxb.) O. Kuntze has been studied for its alkaloidal content many years ago. In 1964, Shellard and Phillipson (1964a) examined leaves of the plant from Burma and isolated isorhynchophylline and rhynchophylline, the open E ring *normal* A and B unsubstituted oxindole alkaloids with ethyl group at C(19), and a 'base-line' alkaloid which was later identified as *anti*-isorhynchophylline N-oxide (Shellard, Phillipson and Sarpong, 1971; Phillipson, Rungsiyakul and Shellard, 1973). They also argued about the plant material from Philippines examined earlier by Barger, Dyer and Sargent in 1939 and Badger, Cook and Ongley in 1950 to be *M. parvifolia* (Roxb.) Korth. in mistakenly identify for *M. rotundifolia* (Roxb.) O. Kuntze. In the mentioned plant material, rotundifoline and isorotundifoline, the open E ring *normal* A and B hydroxy substituted oxindole alkaloids were reported to be present.

Ten years later, in 1974, Houghton and Shellard examined the leaves, stem bark and roots of this species, grown in Burma, collected from the same tree at regular monthly intervals. They found the leaves to contain at least nine alkaloids. Apart from isorhynchophylline and rhynchophylline which has previously been reported, isocorynoxeine and corynoxeine, the open E ring *normal* A and B unsubstituted oxindole

alkaloids with vinyl group at C(19) were reported. In addition, the presence of closed E ring alkaloids, both of heteroyohimbine and oxindole types was revealed. They are unsubstituted alkaloids with *normal* A and B configurations for oxindoles, i.e. isomitraphylline and mitraphylline, and *pseudo* for heteroyohimbine, i.e. 3-isoajmalicine. The latter and another unknown oxindole alkaloid was detected only in some month samples, which was also in the case of the N-oxides of isorhynchophylline and rhynchophylline.

Every sample of stem bark was shown to contain the six oxindole alkaloids as present in the leaves. In addition, rhynchociline, the methoxy substituted analogue of isorhynchophylline, was detected in some month samples but no heteroyohimbine was observed in any sample.

The roots were also found to contain the same six oxindole alkaloids with the addition of rhynchociline and its isomer, ciliaphylline, in some month sample. Again, no heteroyohimbine alkaloid was observed.

This present investigation reveals interesting points and a number of differences from those previously been reported. First of all, all the identified alkaloids are open E ring oxindoles with *normal* configuration, i.e. isorhynchophylline, the unsubstituted A isomer with ethyl group at C(19), and rhynchociline and ciliaphylline, the A and B methoxy substituted analogues also with ethyl group at C(19). This is in contrast with those reported by Houghton and Shellard in 1974 where the closed E ring *normal* A and B oxindole alkaloids, isomitraphylline and mitraphylline were also reported. Furthermore, rhynchophylline is

not detected in this batch of leaves. The methoxy substituted analogues of isorhynchophylline and rhynchophylline, rhynchociline and ciliaphylline, were not previously reported in the leaves but appeared to be the major alkaloids in this present report.

Another difference to note is that an open E ring *normal* oxindole alkaloid was isolated, i.e. specionoxeine, the C(19) vinyl isomer of ciliaphylline. This particular alkaloid has not been reported from this species before and in fact it is the second species of this genus, after *Mitragyna speciosa* Korth., reported to contain this alkaloid. The plant parts reported were leaves (Trager, Lee, Phillipson, Haddock, Dwuma-Badu and Beckett, 1968) and stem bark and root bark (Shellard, Houghton and Resha, 1978b). Both *M. rotundifolia* (Roxb.) O. Kuntze and *M. speciosa* Korth. are the species indigenous to Thailand. However, the A isomer of specionoxeine, isospecionoxeine, was not isolated, though there was traces of another oxindole alkaloid with hR_f values higher than those of specionoxeine. The identity of this alkaloid, if could be isolated, and also the possibility to isolate and identify TS_1, an open E ring oxindole with hR_f values again higher than those of isorhynchophylline would certainly reveal more complete picture of the alkaloidal content of this species. In this particular point, it is interesting to note that the open E ring oxindole alkaloid so far known to have higher hR_f values than isorhynchophylline is rotundifoline, the alkaloid reported by Barger, Dyer and Sargent in 1939 and Badger, Cook and Ongley in 1950. Considering the aromatic substitutions of the *normal* oxindole alkaloids, it has been suggested that the hydroxy

substituted alkaloids lie between the unsubstituted and the methoxy substituted ones in their biogenetic routes (Rungsiyakul, 1973). If this is true in all cases of *Mitragyna* alkaloids, the identity of TS_1 would reveal an interesting feature, especially for the fact that ciliaphylline, the methoxy substituted alkaloid, was found as major constituent. There would seem to be the possibility of the hydroxy substituted alkaloid(s) at least in minor quantity.

Further point to note is that two heteroyohimbines were detected although in too small the amounts to be isolated out. This result is in agreement with those reported by Houghton and Shellard (1974) that only the leaves, and not stem bark or root, was shown to contain heteroyohimbine alkaloid, although it was only one, i.e. 3-isoajmalicine - the closed E ring *pseudo* alkaloid, in the previous report. This is in common with most *Mitragyna* species in which the alkaloids are mostly of oxindole type, especially in the mature leaves. The identities of these two heteroyohimbines would certainly reveal interesting point(s) concerning the alkaloidal content of this species.