THE SERPENTINE VEGETATION OF USSANGODA (HAMBANTOTA DISTRICT) AND NICKEL ACCUMULATING PLANT SPECIES

A S Seneviratne[1], H G Nandadasa[2],W.S.Fernando,[3] H H V M Sanjeevani[2] and R L H R Rajapakse[2]

[1]Department of Botany, University of Colombo
[2]Department of Botany, University of Sri Jayewardenepura
[3]Department of Chemistry , University of Sri Jayewardenepura

The vegetation of serpentine soils has fascinated plant taxonomists, physiologists and ecologists. Many serpentine plant species are used as indicator plants in geo-botanical exploration of mineral deposits and phyto-remediation of polluted soils. Some of the world's serpentine plants have the remarkable ability to selectively accumulate Ni from the soil.

Serpentine body at Ussangoda is overlaid with an ultrmafic soil, which is characteristically rich in Ni, Cr, Fe and Mg. The plain is called 'Rathupas thalawa' - Red soil plain - due to the deep red color of the soil. It is host to a unique type of vegetation tolerant of toxic edaphic condition. As is characteristic of serpentine floras in other parts of the world the vegetation is sparse and the species diversity is low. The plants are stunted prostate in habit and show stress features. The vegetation contrasts sharply with the adjacent non-serpentine vegetation of thorny scrubland and is comprised of plant associations dominated by *Hyabanthus enneaspermus, Evolvulus alsinoides, Fimbristylis falcata, Eurphorbia indica, Crotolaria latebrosa and Blumea obliqua.* Among the other plants which are confined to specific areas on the plain and are of limited distribution are *Phyllanthus simplex, Mollugo nudicaulis, Cassia mimosoides, Chlorophyton laxum, Fimbristylis acuminata, Polygala javana, Ischaemum timorense and Striga euphrasiodes.*

All the plants listed above are serpentine facultative. Of special significance is the occurrence of two types of *Evolvulus alsinoides* wither with blue flowers or with whiteflowers. *Hybanthus enneaspermus* is also found in two types either with pink flowers or with white flowers. The two flower types of *Evolvulus* show distinct flavonoid profiles on paper chromatograms. The existence of 'flavonoid races' has been reported from other serpentine soils in the world

The Ni content of the species analysed ranges from 173-2173 ppm on a dry weight basis and is as follows. *Hybanthus enneaspermus* 2174 ppm, *striga euphrasioides* 1400 ppm, *Cassia mimosoides* 1140 ppm, *Blumea obliqua* 1054 ppm, *Evolvulus alsinoides* 1023 ppm, and *Crotolaria latebrosa* 604 ppm. This signifies that the mechanism of Ni tolerance is either detoxification and or extrusion rather than exclusion.

While the normal Ni content in plants is reported to be 2-15 ppm, all the serpentine species which we have analyzed were found to be accumulators (>100ppm.). Six of these were hyperaccumulators (>100ppm.). The significance of the above findings and the urgent necessity to conserve this unique vegetation and its habitat will be discussed.