10. SUMMARY

T *Senna obtusifolia* (L.) Irwin and Barneby of the family Leguminosae, subfamily Caesalpinioideae, tribe Cassieae, subtribe Cassiinae is a wild herb that grows in a varied ecogeographical regions of India and other tropical and sub-tropical countries. The uses of this medicinally rich annual weed are mentioned in Sanskrit, Ayurveda, and Chinese materia medica. Folklore and ethnomedicinal practices of this species are also quite known. Modern medicinal aspects with multifarious curative properties including hepatoprotective, neuroprotective, chondroprotective, anti-cancer, anti-inflammatory, and anti-diabetic activities have made the plant significant for the presence of various secondary metabolites like anthraquinones, sennosides, anthrones, xanthones, aglycones, polyketides, and sterols.

As ecological conditions and genetic variations can affect the productivity of these chemicals, this study focuses on the intraspecific phenetic variations of *S. obtusifolia* samples collected from twenty provenances in terms of phenological, morphological, cytological, biochemical and genetical aspects. Phenological attributes - plant growth, flowering and fruiting together with temperature, rainfall and altitude of provenances were analyzed. The analysis revealed that the plants from warmer provenances are more vigorous. Different morphometric traits like plant height, girth, branching habit, root length, flower, fruit and seed characteristics, studied here, showed considerable variations among provenances. Cytological studies considering chromosome numbers and their morphology revealed minor variations among provenances with 26 chromosomes as the common diploid number in all the cases. Biochemical variations in respect of one of the active principles, were analyzed with HPLC. The results showed the presence of higher rhein quantity in samples collected from warmer provenances.

The present study pioneered in identifying and quantifying rhein from the leaves of *S. obtusifolia.* Genetic variations among the provenances, studied through AFLP analyses, confirmed minor intraspecific deviations. Thus, it was found that plants from the warmer provenances with higher minimum temperature having greater heights proved to be the best producer of the bioactive molecule rhein.