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Ecology phenology and social context of invasion by selected alien plants in Kerala

The study closely looks at the introduction pathways of the four major invasive species of the State of Kerala – *Lantana camara, Chromolaena odorata, Mikania micrantha* and *Mimosa diplotricha*. These four species were introduced at different time periods to the state. Of these *L. camara* and *M. diplotricha* were intentionally introduced and *C. odorata* and *M. micrantha* were unintentional introductions. The culture of exchange and introduction of exotic plants to various parts of the empire prevailing during the colonial period provided the supportive ambiance for the introduction of *L. camara*. The work could identify a separate introduction of *L. camara* to South India through Lalbagh Botanical garden as an ornamental plant apart from the introduction to Calcutta Botanical garden. The scarcity of food and the necessity for earning a livelihood led to the participation of a number of people in the Second World War as militants and as labourers in Assam, Srilanka, Burma and Singapore providing a supportive circumstance for the repeated accidental introduction of *C. odorata*. The growing demand for the various plantations lead to the import of a number of cover crop and also a number of rubber budwood leading to the purposeful introduction of *M. diplotricha* as one of the cover crop and accidental introduction of *M. micrantha* along with rubber budwood. *M. micrantha* was introduced as a twine tied around rubber budwood imported from Malaysia. In the midland areas, the invasive plants were most copious in the abandoned paddy fields, revenue lands, abandoned private lands, etc. However, in forested landscapes, the invasive plants were abundant and dense along the linear intrusions like roads, powerlines, and plantations. A number of reasons like reduction in monetary profits, tribulations in performing agriculture, increase in real estate and greater opportunities for other jobs lead to the reduction in performing agriculture and making the land favourable for the infestation by invasive plants. The various developmental activities in forest area like revenue from forest plantations, establishment of roads and coupe roads for unproblematic travel, construction of dams and associated powerlines for the meeting the increasing electricity requirements and extraction of timber provided open canopy and disturbed habitats in the forest suitable for the establishment of invasive alien plants. From studying the biological characters it was

revealed that the species adopts a combination of traits which helps in maximizing infestation. *L. camara* and *M. micrantha* show a higher rate of vegetative propagation at the same time *M. diplotricha* shows a higher germination rate. In teak plantations considered for the present study, it was seen that in the young plantations receiving a surplus amount of sunlight and witnessing maximum disturbance, the most prevalent invasive species was *M. diplotricha*. With the growing age of the plantation, i.e. in the age of 3 – 4 years, *M. micrantha* becomes the most abundant species. As the plantations reach more than 10 years of age when the habitat becomes more stable and the canopy close allowing only partial sunlight to pass, *L. camara* and *C. odorata* become the most abundant species. This indicates that with the changes in the environmental condition the species infesting the habitat also varies. In a more stable condition, the more naturalized species are seen and less naturalized species are infesting disturbed habitats.

The study brings out the various biological and ecological characteristics of the major alien invasive plants of the State of Kerala, the socio-political reasons for their arrival and spread and their succession regimes. These pieces of information are crucial in preventing the future influx of new alien invasive species and also to manage the already established alien invasive species in the state.