Investigating additional invasion enhancing characteristics in the alien invasive species Senna spectabilis (DC.) H.S.Irwin & Barneby

Senna spectabilis (DC.) H. S. Irwin & Barneby, formerly Cassia spectabilis, is a medium to big tree that is classified as an Invasive Alien Species (IAS) in India. The term "invasive alien species" (IAS) refers to organisms that are observed outside of their natural range and that adversely affects the ecology of land of its introduction. Like many IAS plants, *S. spectabilis* grows very quickly, produces a lot of seeds and has very good coppicing ability (meaning it quickly re-sprouts from stumps of parent tree when cut down), making it very difficult to eradicate from the environment. Recently, *S. spectabilis* was spotted in Kerala's Periyar Tiger Reserve (Thekkady), where it was found to have spread across substantial stretches, upsetting the local flora and animals. During my preliminary lab analysis for the study, it was found that a couple of the *S. spectabilis* seeds had endophytic fungus inside them and endophytes are known to be beneficial for its host. So plants with endophytes inside them should have survival advantage than those without an endophyte. This also should have resulted in higher occurrence of endophytes in seeds but it was not the case in Periyar Tiger Reserve area. This formed my project idea linked to the existence of an endophytic fungus in an IAS plant. In this project I have tried to address the following two ecological questions;

1. Is an IAS plant's invasiveness influenced by the presence of endophytic fungus?
2. If so, what biological controls exist in nature that preventing such aided invasive phenomenon from spreading so widely?

For further investigation, laboratory trials were conducted and field-based investigations were restricted because the COVID-19 pandemic. The study comes to the conclusion that endophytic fungus does, in fact, serve as a disease causing pathogen in native plants. This contributed to reduced fitness in native plants while simultaneously contributing positively to *S. spectabilis* as an endophyte. The investigation also revealed natural bio-control components from soil biota that prevents the host plant's aided invasive expansion. The organism enabling such a bio-control mechanism was uncovered utilizing culturing, isolation and dual-culture techniques. My project concluded with species level identification of both the endophytic fungus and the soil bacterium responsible for bio-control of endophyte assisted spread using DNA bar-coding techniques.