Effects of begomovirus infection on invasiveness of plant *Croton bonplandianus* Baill.

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Invasive species are considered the second worst threat to biodiversity after habitat destruction, which was altered the function and service of the ecosystem. However, some exotic species fail to become invasive due to newly acquired enemies in the introduced range, as described by the 'increased susceptibility' hypothesis. In the present study, we have tested the increased susceptibility hypothesis: does begomovirus infection play an important role in the invasiveness of *Croton bonplandianus* in its introduced range. To understand the role of viral infection on the invasiveness of *C. bonplandianus*, the healthy and viral infected population density of *C. bonplandianus* was measured at different ecosystems by the quadrat method. Several first- and second-order branches, number of inflorescence per plant, number of buds/inflorescence, number of male and female flower/inflorescence, number of seed/inflorescence, pollen and seed viability, chlorophyll content were measured in infected and healthy populations of *C. bonplandianus*. Results showed that the infected population of *C. bonplandianus* was higher in agroecosystems than in other ecosystems. The number and length of the inflorescences were maximum in healthy plants (24.74 ± 1.78 and 5.78 ± 0.13 respectively) than infected population (7.28 ± 0.88 and 2.04 ± 0.08 respectively). The number of male and female buds per inflorescences were also recorded maximum in healthy plants (21.19 ± 0.86 and 4.44 ± 0.13 respectively) and significantly different from the infected plants (9.99 ± 0.63 and 2.16 ± 0.12 respectively). Further, to identify the nature of the virus, viral DNA was isolated from the infected plant and confirmed through Rolling Circle Amplification followed by digestion to release the 2.7 kb and anticipated 1.3 kb. The above fragments were cloned, sequenced and analysed to identify the nature of the virus molecules. Surprisingly, 2.7 kb matched the papaya leaf curl virus, whereas 1.3 kb showed significant similarity with the alpha satellite, which is associated with the chilli leaf curl virus. Based on the results, we concluded that begomovirus infection has strongly affected reproductive traits of *C. bonplandianus* thus resulting in their failure to become an invasive species at the introduced range. However, the infected population of *C. bonplandianus* acts as a pathogen reservoir for various crop diseases, namely papaya and chilli leaf curl diseases.

Keywords: Begomovirus infection, chilli leaf curl virus, *Croton bonplandianus*, exotic species, papaya leaf curl, pathogen reservoir.

ALIEN or exotic organism innocuous in their native range can be a pernicious organism to native species in introduced ecosystems known as invasive species. The International Union for Conservation of Nature and Natural Resources defines invasive species as an alien species that becomes established in natural or semi-natural ecosystems or habitats, is an agent of change, and threatens native biological diversity. Invasive species are considered the second biggest threat to native species after habitat destruction, which resulted in altering the function and service of the ecosystem with an indirect impact on human health in the introduced range[1–3]. Several hypotheses exist for the invasion success of exotic organisms, such as the biotic resistant hypothesis, enemy release hypothesis, invasion meltdown hypothesis, novel weapon hypothesis, island susceptibility hypothesis and tens rule[4–6]. The enemy release hypothesis is a generally accepted mechanism for the invasiveness of exotic organism, which states that an exotic organism has been introduced into new regions without its natural enemy, which facilitates to establish its population and rapidly increases in distribution and abundance in an invaded ecosystem[7,8]. However, some of the exotic species fail to become invasive due to acquired new enemies in the introduced range over a time period; this is known as the 'increased susceptibility' hypothesis[9–11]. Exotic species have high natural enemies in introduced range due to colonised large areas or longer habitation

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