graphs. Live mite specimens were segregated with the help of a moistened camel hair brush and transferred to 70% alcohol for further processing. The specimens were dehydrated in alcohol series, cleared in clearing medium (mixture of absolute alcohol and lactic acid in 1:1 ratio), slide mounted in Hoyer's medium and identified following keys and relevant literature.

3. Results and Discussion

Results of the study enabled to record the association of both phytophagus and predatory mites, representing 2 suborders viz. Prostigmata and Mesostigmata, on the invasive plant, *B. sulphurea*. The phytophagous mites recovered during the study included members of 3 families viz. Tenuipalpidae, Bryobidae and Tetranychidae while the predatory mites belonged to the family Phytoseiidae. Tetranychidae was found represented by members of two genera viz. *Eutetranychus* and *Tetranychus* while the other families were represented by a single genus each. The tenuipalpid species recovered during the study was *Brevipalpus phoenicis* Geijskes. The family Bryobidae was represented by *Bryobia* sp. *Eutetranychus orientalis* Klein and *Tetranychus* sp. were the species of tetranychid mites recovered during the study.

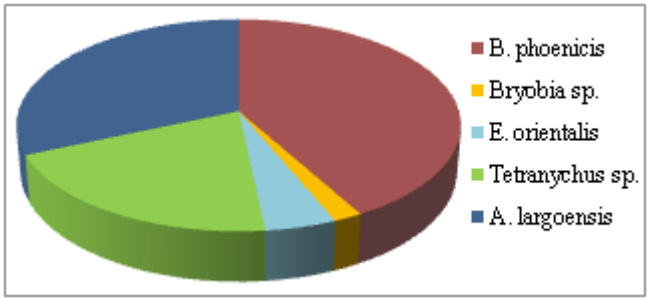

Figure 2: Mean Population Density of Mites On *B. sulphurea* from the 3 Districts of Kerala

All these species are known to be highly polyphagous with wide host range and are listed as major/minor pests of plants with varied economic categories ((Jeppson *et al*. 1975; Chiavegato and Kharfan 1993; Childers *et al.* 2003, Prabheena and Ramani, 2013) Besides the above phytophagous species, a predatory species viz. *Amblyseius largoensis* Muma also could be recorded from *B. sulphurea*. This phytoseiid mite has been recorded as an efficient predator of pest mites like the spider mites, false spider mites and eriophyid mites (Reis *et al*. 2000a).

Figure 3: *Amblyseius largoensis* (Predatory mite) *and Brevipalpus phoenicis* recovered from *B. sulphurea*

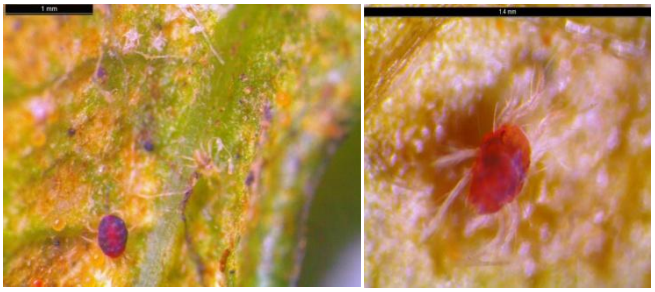

Figure 4: both male and female *Tetranychus* sp. and *Eutetranychus orientalis* recovered from *B. sulphurea*

Results of the field studies disclosed a general tendency of the mites to colonize under surface of middle aged leaves where they preferred to occupy areas adjacent to the mid rib of the host plant leaves. However, in cases of heavy infestation, the mites were found to colonize both surfaces of the leaf lamina. The life stages of the various species were also found mostly confined to the lower surface of leaves, closer to the midrib (Reis *et al.*, 2000 and Childers *et al.*, 2003). All the life stages of the tetranychid and tenuipalpid mites were found to suck the plant sap by their stylet like chelicerae. Desapped regions were easily recognized by the development of damage symptoms like chlorotic spots, yellowing, bronzing of leaves, necrotic areas and leprosis.

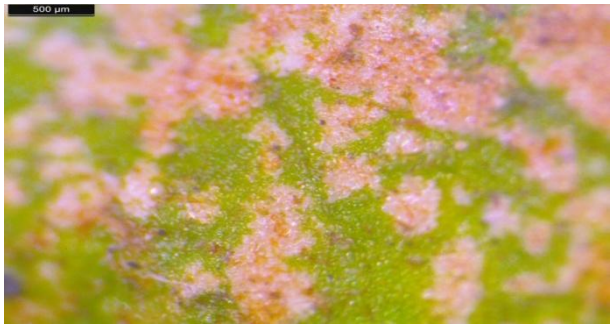

Figure 5: Damage caused by the phytophagous mites on *B.sulphurea*

The population density and distribution pattern of the phytophagous mites showed variation with respect to seasonal and geographic variations. Numerical abundance of these mites could be recorded in April and the minimum population was observed in January. Seasonal changes in diversity and density of arthropods in tropical regions have been correlated with alterations in various local environmental factors like temperature, rainfall and relative humidity (Klein *et al*., 2002; Philpott *et al*., 2006; Teodoro *et al*., 2008). A positive correlation between mite density and physical factors like temperature and relative humidity was reported earlier in the case of gall forming eriophyid mites while rainfall exerted a negative correlation (Nasareen and Ramani, 2014). *B. phoenicis* recorded. The highest mean population density was recorded for *B. phoenicis* (646.9 individuals / 25 leaves), followed by *A. largoensis* (487.4 individuals / 25 leaves) and *Tetranychus* sp. (311 individuals / 25 leaves), *E. orientalis* (70.8 individuals / 25leaves) and *Bryobia* sp. (28.4 individuals / 25 leaves).

The population density of the mites showed variation with respect to geographical variation also. During the present study, all the species except *B. phoenicis*, showed maximum

population in Palakkad Dt. followed by Malappuram and Thrissur. The population of *B. phoenicis* was found high in Palakkad Dt. followed by Thrissur and Malappuram Dts.

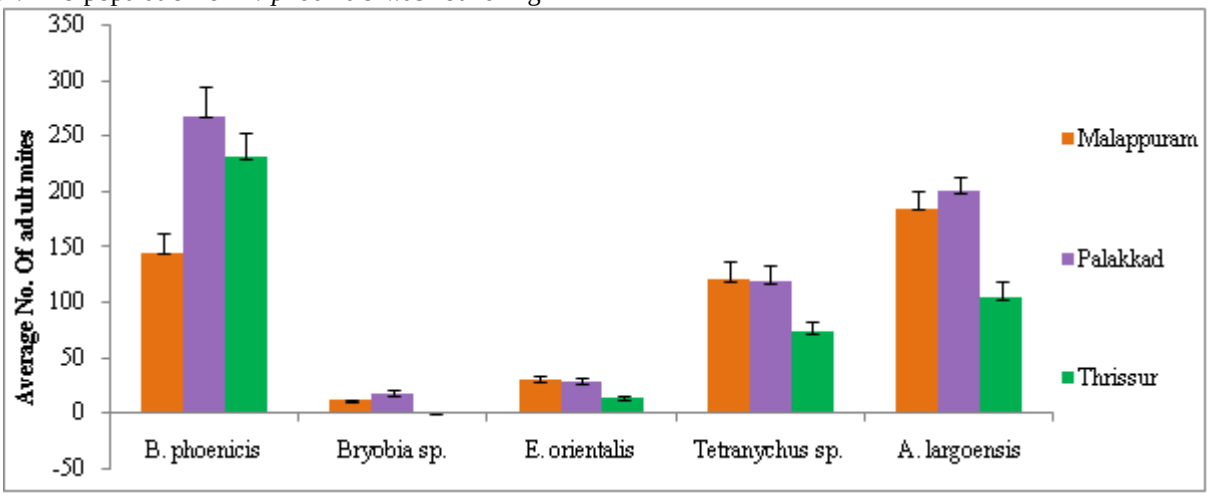

Figure 6: Comparative Analysis of Mite population from different sites

4. Conclusion

Invasive alien plants, usually escape cultivation and become agricultural pests, infest lawns as weeds, displace native plant species, reduce wildlife habitat, and alter ecosystem processes. Mites, being a less explored group in India, especially in Kerala, studies were undertaken to explore and exploit their potential towards the regulation and effective suppression of the invasive plants, to ensure ecosystem functioning. Results of the present study revealed maximum population of mites during the dry season. *B. phoenicis* was species with highest population density followed by the predatory mite *A. largoensis*, *Tetranychus* sp., *E. orientalis* and *Bryobia* sp. The mite population density was found high in Palakkad Dt. followed by Malappuram and Thrissur, except in the case of *B. phoenicis*, which showed high population in Palakkad, followed by Thrissur and Malappuram. Feeding symptoms induced by mites included the presence of chlorotic spots, yellowing, followed by bronzing of leaves and development of necrotic areas and leprosis.

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