ABSTRACT

Insects are the important components of ecosystem. They play important ecological roles in the form of predators, pollinators, scavengers, herbivores and pests. The present study was conducted to compare the insect diversity and guild structure of old groves and newly rehabilitated stands of thorn forest community at Harappa archaeological site. Insect samples were collected for three years from 2010-2012. Different traps i.e., pifall traps, sweep nets and light traps were used for the collection of insect species. A total of 13838 insects belonging to 136 insect species under 14 insect orders and 52 families were collected from old groves while at restored site a total of 7650 insects belonging to 76 insect species under 13 insect orders and 39 families were collected. Different diversity parameters i.e., Shannon index, Simpson index, Hill diversity index and Sorenson similarity index were used to explain the insect diversity at both the sites. Insect species belonging to orders Coleoptera, Hymenoptera, Orthoptera, Lepidoptera, Diptera, Odonata, Dictyoptera, Hemiptera, Dermaptera, Neuropter, Thysanoptera, Isoptera, Homoptera and Collembola were collected from old groves. Insect species belonging to all these orders except Collembola were also found to be established at restored site. Results showed that diversity of all the insect orders was significantly less ($p < 0.01$) at the restored site except Isoptera. Highest number of insect species was found to be associated with *Capparis decidua* i.e., 115 while 88 insect species were found to be associated with *Tamarix aphylla*, 78 insect species with *Salvadora oleoides* and 46 insect species were found to be associated with *Prosopis cineraria*. Cluster analysis revealed that all insect orders collectively showed association of similar insect species between the climax species of thorn forest community i.e., *S. oleoides* and *P. cineraria* while *C. decidua* and *T. aphylla* (members of sub-climax association) had dissimilar insect-plant associations. Hymenoptera, Dictyoptera, Diptera, Isoptera, Thysanoptera Homoptera and Coleoptera showed similar insect-plant associations between *S. oleoides* and *P. cineraria*. Hymenoptera, Dictyoptera and Diptera also showed similar insect-plant associations between *C. decidua* and *T. aphylla*. Hemipterans and Orthopterans showed similar insect-plant associations between *S. oleoides* and *C. decidua*. Lepidopteran species had similar insect-plant associations between *S.*

oleoides and *T. aphylla*. In case of Neuroptera and Odonata, *T. aphylla* and *C. decidua* showed similar insect plant associations. *S. oleoides* and *T. aphylla* is the major insect-plant association currently present on the mound because of their abundant numbers as compared to the rest two species. At both sites, insects play different roles in the forms of Predators, Visitors, Scavenges, Herbivores, Pollinators and Pests. At old groves, 25% Predators insect species followed by Visitors (22%), Scavengers (20%), Herbivores (15%), Pollinators (12%) and Pests (5%) were present. Similar trend was followed at the restored site where Predators were the most diverse trophic guild with 24% insect species followed by Visitors (18%), Scavengers (19%), Pollinators (17%), Herbivores (17%) and Pests (6%). Diversity of all insect guilds was significantly less at restored site. These results indicated that insect species are good indicators of restoration success. It is concluded that after 12 years of restoration, both the sites showed 72% similarity of the insect species. It is expected that with the increasing age of the plant community greater habitat and food resources will be available that will enhance the diversity of insects at the restored site.