



## Impact of grazing and life forms interactions on plant communities in arid areas

Mohammad Noor Alhamad

Jordan University of Science & Technology, Natural Resources & Environment, Irbid, Jordan (malhamad@just.edu.jo)

Middle Eastern Mediterranean grasslands have evolved 8000-9000 years before present (BP). These grasslands were prehistorically subject to persistent pressure from grazing domesticated animals. Grazing and competition are the central factors affecting grassland communities, linking their maintenance, productivity, and management to biodiversity and livestock production. Arid and semi-arid Mediterranean grassland is a rich source of valuable forages for grazing livestock production systems in the eastern part of the Mediterranean region. Competition treatments (absence/presence of neighbors) were combined with three defoliation (as surrogate to grazing) intensities (0%, 30% and 60%) in a factorial design. Relative interaction index (RII) was used to measure competition intensity. RII standardizes the reduction in growth of one species due to presence of neighbor species. Competition reduced grass biomass by approximately 10-15% for final and cumulative biomass. Competition role was eliminated under heavy defoliation or under harsh environmental conditions. Defoliation showed variable results on final and cumulative biomass. While heavy defoliation (60% clipping intensity) greatly reduced final grass biomass, light-moderate defoliation (30%) has increased cumulative biomass. Results showed that competition may limit the direct effect of defoliation on dominant grass species. Further, competition effect on dominant annual grasses showed positive and negative effects in relation to site productivity and best explained by a sinusoidal model. This hypothesized sinusoidal model suggests that facilitation and competition are alternatively affecting grassland communities along productivity gradient. The nature of interaction changes with changing community productivity revealing a cyclic pattern. The reflection points where interaction switches from facilitation to competition may explain the mechanism of maintaining high species diversity at intermediate level of community productivity. The experimental defoliation exerted a pronounced effect on plant productivity and modified the nature of interaction between annual grasses and other growth forms. These mechanisms may explain the ability of *Avena* and *Hordeum* species to form persistent annual climax grasslands in semi-arid rangelands. These findings may suggest that *Avena* and *Hordeum* species may be used in revegetating degraded arid areas