Seed Dispersal by Different-sized Herbivores and its relationship with established vegetation in Kolah--Ghazi National Park

Abstract

Seed dispersal via dung (endozoochorous seed dispersal) is one of the vital impacts of herbivores on rangeland habitats which plays key role in vegetation dynamics of such ecosystems. This is truly important for arid and semiarid ecosystems in which most of plant species regenerate by seeds. To assess the potential seed dispersal of plant species by different-sized herbivores in rangeland habitats of Central Iran, three wild herbivore species of cape (or brown) hare (*Lepus capensis*), Persian gazelle (*Gazelle subguttrosa*) and wild goat (*Capra aegagrus*) in Kolah-Ghazi National Park were considered. 10 habitat sites including 5 independent replicates for wild goat and 5 ones for another two herbivore species were selected. During spring and autumn growing seasons (April to June and October to November), inflorescences production and grazing pattern of all plant species were studied using five 15m^2 belt transects (30 x 0.5m). In each sampling period, 10 freshly pellet groups (dung sample) of herbivore species were randomly collected in each of selected habitat sites (5 sampling period, 5 habitat sites for each herbivore, in total 750 dung samples). Dung samples were dried in a dark room by exposing to open air and then from each a 50 g sample was taken and kept in refrigerator for two months at 3 c for cold stratification treatment. Seed content of dung samples were determined in greenhouse germination experiments over a period of 8 months. In total, 3766 seedlings from 60 plant species (19, 43 and 45 seed species in dung samples of cape hare, Persian gazelle and wild goat, respectively), 31 families and 54 genera were recorded in dung samples of the three herbivore species. Dung seed content was mainly composed by annual herbaceous species with attractive inflorescences which have no dispersal mechanism except production of many small seeds. The highest and least dung seed density for all herbivore species were observed in April and November samples, respectively. Seed species composition of dung samples significantly differed between different-sized herbivores. Also, the number of seed species dispersed via dung of three herbivore species was directly related to their body sizes. However, the observed differences in dung seed density of herbivore species was not related to their sizes; so that the highest and the least number of seeds were recorded in dung samples of wild goat and Persian gazelle, respectively. Comparison between the species composition of dung samples and of the inflorescence production transects where they had been dropped, showed that dung seed content of larger herbivores (wild goat and Persian gazelle) might be more as a result of both forage selection pattern and number of inflorescences (seeds) produced, whereas, in case of hare it might be mainly associated with forage selection pattern. Given that most of plant species recorded in the Park regenerate by seeds, and that seeds of different plant species dispersed by herbivore species, seed dispersal via dung of different-sized herbivores may play an important role in vegetation conservation and dynamics of these rangelands habitats, only if necessary environmental factors met. While increasing knowledge of plant seed dispersal, results of the present research can be specially applied in managing country's protected ecosystems and rangeland habitats.

Keywords: Seed germination experiments, foliage selection pattern, vegetation dynamics, seed and inflorescences production, rangelands habitats, dung seed content.