Shifts in Arable weeds Diversity and Community Structure in Response to Agricultural Intensification Practices: a case study from northern Morocco

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Abstract

Arable weeds refer to plants that are associated with agricultural land, they are pioneers of secondary succession, and they possess adaptations that allow them to proliferate in disturbed environments. In North Morocco's Tingitane peninsula, we conducted a comparative survey of weed flora along an altitudinal gradient from the Atlantic coast to an elevation of 1000 meters. This gradient corresponds to an inversely proportional intensification of agriculture, pitting traditional agroecosystems against modern, intensive counterparts. Our aim is to evaluate the impact of varying crop management practices on the diversity, structure, and composition of weed communities. We conducted a total of 133 floristic surveys across six agricultural sites. Our surveys identified 220 weed species, belonging to 36 botanical families, comprising 31 dicotyledons and 5 monocotyledons. Notably, the Asteraceae, Poaceae, and Fabaceae families collectively constituted 43% of the total species count. In terms of biological characteristics, therophytes predominated at 79.9%, followed by hemicryptophytes and geophytes at 10.2% and 6.8%, respectively. Mediterranean taxa constituted 57.4% of the overall species diversity. To qualitatively classify the nature of agroecosystems at the six sites, we employed five agrodiversity indices. Our findings revealed that the Tankoube site exhibited the highest agrodiversity, followed by Tafza, Bellota, Boujdiane, Khemis Sahel, and Laaoumra in descending order. When examining biodiversity indices for weeds, the diversity gradient closely mirrored that of the agrodiversity indices. This alignment suggests that the specific diversity of weeds can be attributed to the nature of the agroecosystems and the agricultural techniques employed at each site. Our findings underscore the profound influence of agricultural practices on shaping arable plant

communities within agroecosystems, and they emphasize the decline in weed diversity that accompanies agricultural intensification.