شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم

HANAA ALY

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جامعة عين شمس

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قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

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Faculty of Women's for Art,
Science and Education

Population Ecology of *Plantago major* L. in Egypt

Thesis

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for requirements of philosophy of Doctorate Degree in Botany
(Plant Ecology)

To

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POPULATION ECOLOGY OF *PLANTAGO MAJOR* L. IN EGYPT

Manar Alaa Soliman Mohammed

ABSTRACT

Plantago major has been used to treat various diseases since ancient times. The present study aimed to investigate the population dynamics, phytochemical, molecular and biological characteristics of *P. major* from different habitats seasonally, in addition to identify and analyze its common associated plant communities. Also, evaluate the ecological and economic importance of *P. major* and Estimate the allelopathic effect of it on seed germination and growth of economic crops. Eight heterogenic habitats (ditches, urban, fallow lands, canal banks, cultivated crops, field edges, orchards, and roadsides) were selected for collecting plant data, sampling and analysis. One hundred species were recorded associated with *P. major*; therophytes were the dominant life form and pluri-regionals were the dominant chorological elements. The application of TWINSPAN led to the recognition of 14 vegetation groups with *P. major* - *Convolvulus arvensis* group (VG F) was the most diverse, and *P. major* - *Amaranthus hybrids* group (VG A) was the least. Regarding the growth performance of *P. major*, canal banks and cultivated crop habitats as well as spring season were the most flourishing variables, while fallow lands and urban habitats as well as summer season were the most diminishing. The highest standing crop biomass of root fresh weight, shoot fresh and dry weight, and fresh and dry biomass were recorded in cultivated crops; and root dry weight in fallow lands, during spring. The highest chlorophyll a, b and total chlorophyll were recorded in field edges, while the highest carotenoids content was in orchards. The highest shoot P, K and Mg contents were recorded in ditches, field edges and orchards, respectively during spring, while the highest N was in canal banks during winter. *Plantago major* roots accumulated higher concentrations of most heavy metals than the shoots. The bioaccumulation factor is > 1, while the translocation factor from roots to shoots is < 1. So *P. major* is a suitable candidate for the study metals phytostabilization. The nutritive values of the above-ground shoots of *P. major* lie within the range of nutritive value of sheep, goat, dairy cattle, and beef cattle. The germination of wheat grains, clover, nettle-leaved goosefoot and scarlet pimpernel seeds were found to be sensitive to the high concentrations of *P. major* shoot water extract. The phytochemical screening of the ethanolic and

chloroform extract of *P. major* showed the presence of cardiac glycosides, flavonoids and phenolic compounds. The separation and estimation of phenolic compounds of the *P. major* leaves using HPLC technique identified ellagic acid, catechol, resorcinol, gallic acid and phloroglucinol, while flavonoid compounds produced apigenin, luteolin, chrysoeriol, rutin, quercetin, kaempferol and avicularin. The phytochemical profiling of *P. major* using GC-MS revealed the existence of 27 compounds most of which have biological and therapeutic importance. The most active extract against the test bacterial and fungal strains was the methanol extract, followed by ethanol, while water extract had weak effect on all tested organisms.

CONTENT

List of Tables