

## Importance of Vegetation Studies in Conservation of Wildlife: a Case Study in Miankaleh Wildlife Refuge, Mazandaran Province, Iran

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### Abstract

Study of floristic composition of vegetation is crucial for biodiversity and conservation management by providing habitats for wildlife and contributing to the ecologically sustainable management of natural resources. Miankaleh peninsula considered of high conservation value owing to its floral and faunal characteristics. A study was carried out in Miankaleh, in 2002, to determine floristic composition and available vegetation types carrying a central importance in foods and shelter habits of the wildlife. Therefore, the total 70 quadrats of the size 100 and 25 sq.m., based on defining minimal area, were located in the area and each predefined homogenous unit was received 10 quadrats. Plant species and their abundance and dominance were recorded. Seven vegetation types viz. *Plantago indica*-*Carex nutanse*, Pure *Punica*, *Punica*-*Rubus*, *Punica*-*Juncus*, *Juncus*-*Rubus*, Pure *Juncus* and *Frankenia hirsuta*-*Plantago coronopus* were recognized in the area. Vegetation profile of each type was also depicted. In *Plantago indica*-*Carex nutanse* (Psamophyte) vegetation type, a strip planted by alder<sup>9</sup> species (*Alnus subcordata*) could supports as a nest for *Falco subbuteo*. Pure *Punica* (Pomegranate) vegetation type that occupied most of the central part of the peninsula has been covered mostly by *Punica granatum*. It is a good habitat for black francolin cocks (*Francolinus francolinus*), Isabel shrike (*Lanius isabellinus*), robins (*Erithacus rubecula*), *Phasianus colchicus*, *Otis tarda*, *Chlamydotis undulate*, *Coturnix coturnix* and *Scolopax rusticola*. Some plant species are important elements of the food chain in Miankaleh.

**Keywords:** vegetation type, vegetation Profile, wildlife, Conservation, Miankaleh.

### اهمیت مطالعات پوشش گیاهی در حفاظت از حیات وحش میانکاله، استان مازندران

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### چکیده

مطالعه و بررسی ترکیب فلورستیک پوشش گیاهی از اهمیت خاصی در مدیریت حفاظت و تنوع زیستی برخوردار است. شبه جزیره میانکاله به علت قون و قلور ویژه موجود، دارای ارزش حفاظتی بالایی است. بنابراین مطالعه‌ای به منظور شناخت ترکیب فلورستیک و تعیین تپه‌های گیاهی موجود و نیز رسم پروفیل پوشش گیاهی در میانکاله در سال ۱۳۸۱ انجام شد تا نقش آنها از نظر غذا و پناهگاه برای حیات وحش مشخص شود. برای تعیین و نامگذاری تپه‌های گیاهی، در هر واحد رویشی همگن تعداد ۱۰ کوادرات ۱۰۰ متر مربعی و ۲۵ متر مربعی بر اساس سطح حد اقل و ماهیت پوشش گیاهی برداشت گردید. تعداد کل کوادراتها با توجه به زمان، هزینه و دقت آمار برداری ۷۰ عدد انتخاب شد. گونه‌های گیاهی به همراه فراوانی و پوشش آنها در هر کوادرات گزارش گردید. نتایج نشان داد که در این منطقه، ۷ تپه گیاهی ماسه دوست (*Plantago indica*-*Carex nutanse*)، انار خالص (*Punica*)، انار خالص (*Punica*-*Rubus*)، انار سازو (*Punica*-*Juncus*)، سازو-تمشک (*Juncus*-*Rubus*)، سازوی خالص (*Pure Juncus*) و شوربند (*Frankenia hirsuta*-*Plantago coronopus*) وجود دارد. تپه گیاهی ماسه دوست، با پوشش توسکای ییلاقی (*Alnus subcordata*) پناهگاه و آشیانی مناسب برای پرند شکاری *Falco subbuteo* می‌باشد. همچنین تپه گیاهی انار خالص که بیشتر بخش‌های مرکزی شبه جزیره را با حضور گونه انار (*Punica granatum*) اشغال نموده است زیستگاهی مناسب برای پرندگانی مثل *Francolinus*، *Phasianus*، *Erithacus rubecula*، *Lanius isabellinus*، *francolinus*، *colchicus*، *Otis tarda*، *Chlamydotis undulate*، *Coturnix coturnix* و *Scolopax rusticola* است. بررسی ترکیب فلورستیک در تعیین توزیع گیاهاتی که به عنوان غذا برای وحش استفاده می‌شود اهمیت دارد.

کلیدواژه‌ها: تپه گیاهی، پروفیل پوشش گیاهی، حیات وحش، حفاظت، میانکاله.

## Introduction

Wildlife refuges are particularly important in protecting and managing of habitats and wildlife. Among 25 wildlife refuges introduced in Iran (Madjnoonian, 2000), Miankaleh peninsula, located in south-east of Caspian Sea, Mazandaran Province, with the total area of 68800 ha., is considered of high conservation value owing to its floral and faunal characteristics. The habitat is one of the nine biosphere reserves in Man and the Biosphere Program (MaB). Special characteristics of the area make it a suitable habitat for terrestrial and aquatic plants and animals as well as migratory birds. It supports a variety of special plant species, wildlife and birds which could not be seen in other parts of Mazandaran. It is a wintering area for thousands of water birds, which mainly come from Siberia, but it is also important as a passing and wintering area for songbirds and birds of prey (World Wide Web).

Millions of species lived at some time in the past and are now extinct (Brown and Lomolino, 1998). Just as all individuals eventually die, all species eventually go extinct. It is estimated that 99.9% of all species that ever lived are now extinct. This is an alarming figure needed for consideration (Meffe *et al.*, 1997).

Nowadays, there is hardly any big game left in Miankaleh. The current list of mammals comprises the jackal (*Canis aureus*), the hedgehog (*Erinaceus europaeus*), the jungle cat (*Felis chaus*), the Indian crested porcupine (*Histrix indica*), the hare (*Lepus capensis*), the otter (*Lutra lutra*), the Caspian seal (*Phoca caspica*), Wild Boar (*Sus scrofa*) and the fox (*Vulpes vulpes*). The presence of wolves (*Canis lupus*) has also been reported though this seems very doubtful nowadays (World Wide Web). Flora and vegetation of Miankaleh were investigated by Zehzad *et al.*, (1990). Chorology, life form and flora of Miankaleh Wildlife refuge were also studied by Ejtehadi *et al.*, (2003). Based on this work, 242 plant species belong to 48 families were identified.

Vegetation and floristic composition are very important for conservation of biodiversity by

providing habitat for wildlife and contributing to the ecologically sustainable management of natural resources. Documenting floristic composition and vegetation types of Miankaleh are valuable for continuing ecological research, management and conservation of plants and wildlife. Any disturbance or changes in the native vegetation may affect wildlife, sustainable use of natural resources and conservation of biological diversity. Therefore, the aim of this study was to determine available vegetation types and some plant species carrying a central importance in shelter habits and foods of the wildlife.

## Materials and Methods

### Study Area

Miankaleh peninsula, is located in south-east of Caspian sea in Mazandaran province with the total area of 68800 ha. It is between 53° 25' - 54° 02' longitude and 36° 48' - 36° 55' latitude with the altitude of 15-25 m.a.s.l. It is consisted of two terrestrial and aquatic ecosystems each with the approximate area of 25000 and 43800 ha., respectively. It is one of the nine biosphere reserves in the MaB program and one of 25 wildlife refuges introduced in Iran (Figure 1). The mean annual precipitation is 600-700 mm.

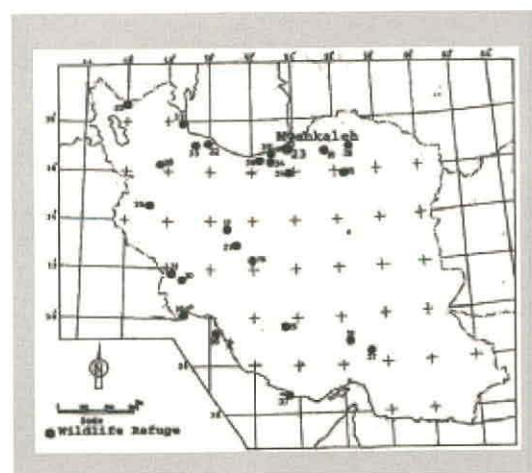


Figure 1- Spatial distribution of 25 wildlife refuges in Iran (From Madjnoonian, 2000, with a little modification). Miankaleh wildlife refuge is labeled with 23.



### Floristic and Physiognomic Study of Vegetation

Floristic study of vegetation is important to determine the distribution of food plants for wildlife. Therefore, about 70 quadrats of the size 100 and 25 sq.m., based on defining minimal area, were located in the area in 2002. Seven vegetation units that were homogenous in structure and ecological characteristics of the habitat were selected based on field survey and 10 quadrats were located in each unit. Size of the quadrats in psamophyte and halophyte types was 25 sq.m. and 100 sq.m. for the others. Plant species present in each quadrat along with their abundance and dominance were recorded. Vegetation types of the area were determined through recording different vegetation parameters and by calculating Importance Value (IV) and IV ranks. Species with the highest Importance Value (IV) was assigned rank 1, the second rank 2 and so on (Barbour *et al.*, 1999). 242 plant species belong to 48 families were identified and their chorology and

life form were obtained (for more information see Ejtehadi *et al.*, 2003). Some important plant species of each type along with their role in feeding of wildlife were elaborated. Defining vegetation parameters including density, height and distribution of shrubs, thickets, trees and dominant species of each vegetation type were considered in order to help understanding the suitable shelter of the animal. Vegetation profile of each type was also depicted.

### Results and Discussion

Seven vegetation types viz. *Plantago indica*-*Carex nutans* (Psamophyte), Pure *Punica*, *Punica*-*Rubus*, *Punica*-*Juncus*, *Juncus*-*Rubus*, Pure *Juncus* and *Frankenia hirsuta*-*Plantago coronopus* (Halophyte) were recognized in the area. The number of species recorded in each of the above mentioned vegetation types was 132, 83, 92, 81, 63, 82 and 23, respectively. Vegetation profiles of six types were depicted and are shown in Figure 2 (a-f).

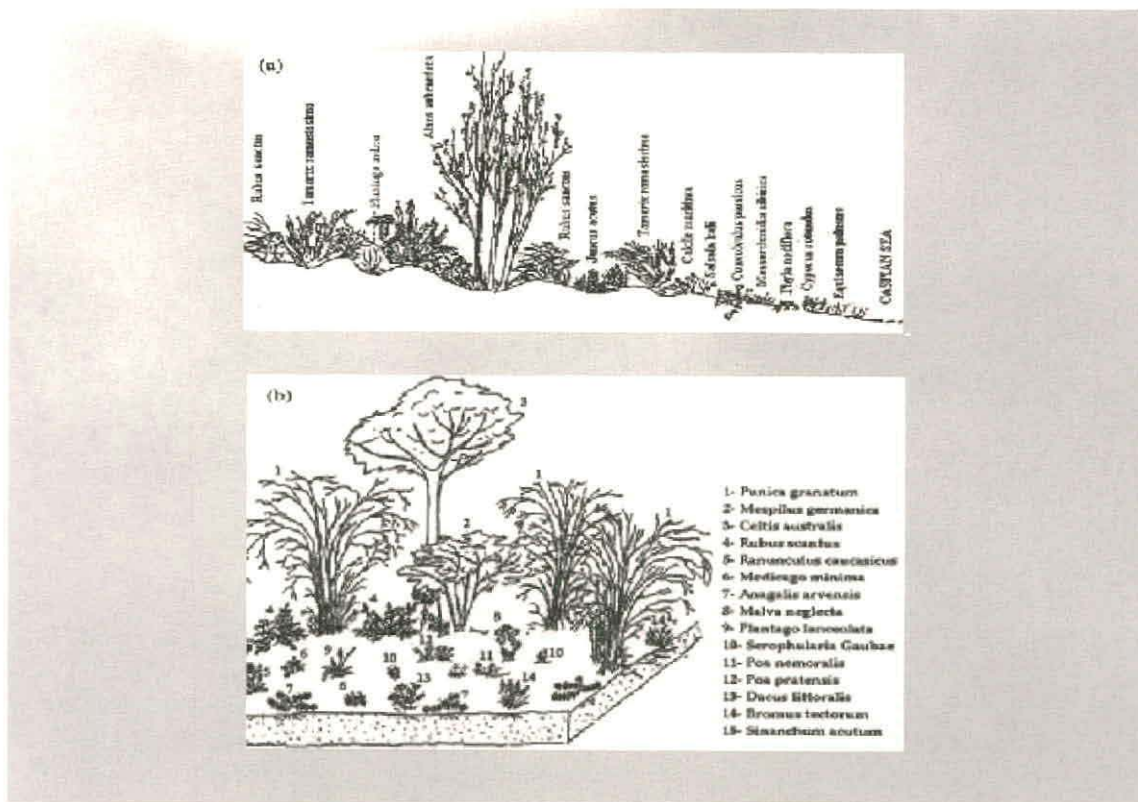
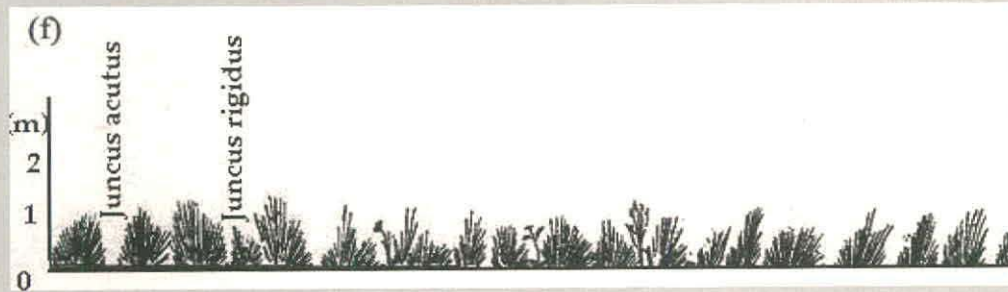
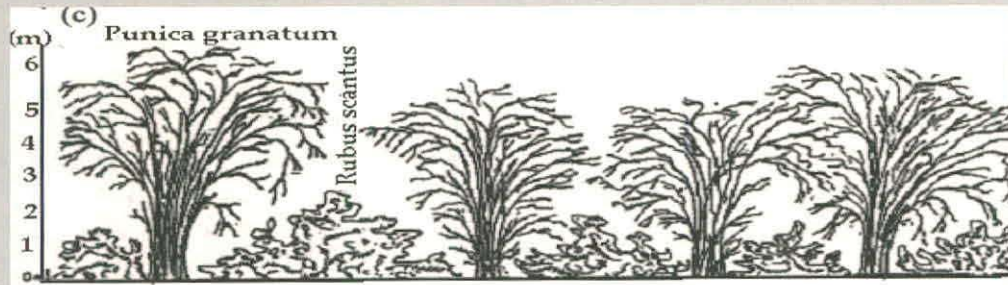


Figure 2- Vegetation profile of six vegetation types including *Plantago indica*-*Carex nutans* (Psamophyte) (a), Pure *Punica* (b), *Punica*-*Rubus* (c), *Punica*-*Juncus* (d), *Juncus*-*Rubus* (e) and Pure *Juncus* (f).

Continue Figure 2





In order to better understand the life history of a specific animal, interest may be focused on the food and shelter habits (Kuchler and Zonneveld, 1988). Vegetation parameters such as density, height and distribution of shrubs, thickets, trees and floristic list of each vegetation type could help understanding the suitable shelter of the animals.

In *Plantago indica*-*Carex nutans* (Psamophyte) vegetation type of Miankaleh, a strip planted by alder species (*Alnus subcordata*) which divide the vegetation type to a sandy beach and a sandy hill could supports as a nest for *Falco subbuteo*. *Phalacrocorax carbo*, *Pandion haliaetus*, *Egretta alba*, *Corvus corone*, *Pica pica* are the birds of this vegetation type that take *Alnus subcordata* plant species for their nesting and resting. *Ardea cinerea*, *Anas crecca*, *Tringa totanus*, *Tachybaptus ruficollis*, *Charadrius alexandrinus*, *Hydroprogne tchegrava* and *Anas* spp. are other kinds of birds that present in the seashore. They sometimes predate *Gammarus pulex*. In the dusk, the endemic mammal of Caspian sea, Caspian seal (*Phoca caspica*), start resting and warming his body in sandy soil of the seashore and in *Phragmites communis* as well. The scientific names of the birds were adopted from Behroozi Rad, 1991.

*Celtis australis* is a tree species in this vegetation type which has been overgrazed by grazing animals. *Sida rhombifoli*, *Cakile maritime*, *Messerschmidia sibirica*, *Convolvulus persicus*, *Equisetum palustre*, *Maresia nana*, *Artemisia Scoparia* A. *Tschernieviana* and *A. fragrans* are another plant species presented in this vegetation type.

Pure Punica (Pomegranate) vegetation type that occupy most of the central part of the peninsula has been covered by *Punica granatum*. It is a good habitat for black francolin cocks (*Francolinus francolinus*), Isabel shrike (*Lanius Isabellinus*), robins (*Erithacus rubecula*), *Phasianus colchicus*, *Otis tarda*, *Chlamydotis undulate*, *Coturnix coturnix* and *Scolopax rusticola*. These birds usually could be seen under *Punica granatum* plant species finding seeds of *Aegilops crassa*, *Avena barbata*, *Briza minor* and

*Hordeum glaucoma* in the ground layer. They usually build their nests on *Punica granatum*, in the centre of the vegetation type, where the plants are large and of high density. This type is also a good shelter for mammals such as *Sus scrofa*, *Canis aureus*, *Hystrix indica*, *Rattus norvegicus* and *Mustela nivalis*.

Different kinds of plant species could be seen in Punica-Rubus vegetation type. So it can supports certain birds and animals presented in Pure Punica and Juncus- Rubus vegetation types.

*Lonicera floribunda*, *Rubus sanctus*, *Avena eriantha*, *Millium vernale* are some of plant species occurred in Punica-Juncus vegetation type. Birds such as *Turdus philomelus*, *Sturnus vulgaris* and *Passer montanus* use seeds of *Rubus sanctus* as food. Mammals have important roles in dispersal of the plant seeds too.

Juncus- Rubus vegetation type is also a good habitat both as shelter and food resource for some birds and mammals.

Different species of *Juncus* spp. such as *J. acutus* and *J. rigidus*, *Orchis palustris*, *Plantago coronopus*, *Suaeda maritima*, *Tragopogon graminifolius*, *Frankenia irsuta* and *Bromus tectorum* were presented in Pure Juncus vegetation type. Some birds such as *Gavia arctica*, *Ncticorax ncticorax*, *Egretta garzetta* and *Threskiornis aethiopicus* present in this vegetation type.

*Frankenia hirsuta*-*Plantago coronopus* (Halophyte) is the last vegetation type presented in Miankaleh. The dominant plant species are *Spergularia marina*, *Suaeda maritima*, *Juncus* spp and *Frankenia hirsuta*. Some plant species are presented in this type which couldn't be seen in other types. Most of the migratory birds are seen here. *Gavia stellata*, *Tachybaptus ruficollis*, *Pelecanus onocrotalus*, *Pelecanus crispus*, *Phalacrocorax carbo*, *Botaurus stellaris*, *Ardeola ralloides*, *Egretta* spp., *Ardea cinerea*, *Plegadis falcinellus*, *Branta ruficollis*, *Anser* spp., *Cygnus* spp., *Tadorna ferruginea*, *Anas acuta*, *Anas* spp., *Haliaeetus leucoryphus*, *Pluvialis* spp, *Tringa* spp. and *Numenius tenuirostris* are presented in this vegetation

type supplying their foods from halophytes and small aquatic creatures. Sometimes they rest on succulent branches of *Salicornia europaea* plant species. This species provide a suitable substrate to reproduce small aquatic creatures which feed the birds. Vegetation are very important in protecting and managing wildlife providing suitable habitats for animals. Unmanaged exploitation of vegetation can not only decrease species diversity of plants but also decrease animal species diversity. Special floral and faunal characteristics of the area mentioned above supports the need for ecological investigation of vegetation.

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