Autecology Study of Astragalus brevidens in khorassan

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Abstract
In order to using important range species for range improvement identification of ecological condition from wiew in habitance and life account knowledge is very important. Sainfoein Astragalus (*Astragalus.brevidens*) is one of the most useful species of semi - step range land in Khorassan province.
Here we studied distribution zones of *Astragalus brevidens* in khorassan , companion and vegetation habitat , relationship of investigated speicies with , topography , Geomorphology , soil and climate in habitats of *Astrgalus brevidens.*
Furthermore, seed germination, plant phenological under habitat conditions, nitrogen fixation ,root system , reaction to grazers , plant production ,Chemical compounds , diseases and pests were studdied .
Survey results showed that , habitats of *Astragalus brevidens* was limited to in mountain zones of North and center Khorassan.
Many of cousion plants (such as: *Onobrychis cornata , Astragalus heratensis , Acantholimon spp*) and grasses for exampel *Bromus kopetdaghensis , Agropyron spp , Festuca ovina and Dactylis glomerata* are the most indicators of companent speicies with *As.brevidns* in Khorasan range land.
Height range of *Astragalus brevidens* in different habitats is 1250-2500(m) a bove the sea levl. the most habitats of *Astragalus* has been located at Binalood and kopedagh geological formation. This regions have high mountains and calcaric regosols and little alkaline more habitats has been non Gype and are little alkaline in vegetative region of Astragalus. texture of soil Was determined silty , silty-loam , loam,sand loam and clay loam.
Astragalus brevidens has favorable disturbed in cold-semi-arid and mountain climates. Annual rainfal at habitats conditions is changed between 200-550 ml/per year and Annual tempreture is 5.2 - 14.3 C. seeds of this plant has hard coat and seed germination incrased with scarification. The most germination was occured in 15 degree centigraed
nodules There is for nitrogen fixation in root systems of *Astragalus brevidens.* This plant have a bout %20.4 crud protein , that is considerable. High Palatability of this plant, and over grazing wich caused that this plant decline and usually we can see it in fencey cites in range lands and dry land farming cultivations.

Key words: Autecology , *Astragalus brevidens* , Ecology

Introduction :

Iran is located on arid and semi arid regions of the world. Climatic diversity in different regions caused one of the richest flora in the world. Native species adabtability hard environmental conditions make them a favorable resources for range land improvement
Sainfoein Astragalus (*Astragalus brevidens*) is one of the most useful species of semi step range land in Khorassan province. It can be used for range land rehabilitaion in mountain and semi step range land. Unfortunately, It is at the extinction because of being palatable and overgrazing which caused that this plant decline and usually we can see it in fancy cites in range lands and dry land farming cultivations.

Material and methods:

This research was conducted to study the habitat characteristics (Topography Geomorphology, soil and climate change), phenology , morphology and factor affecting on Astragalus brevidens regeneration . three habitats were selected in north, south and south west of Mashhad. some plants were marked for study of phenology and morpholo-gical characteristics. the were recorded in 10-15 day intervals during three years.
Geological maps (1:250000) were used for study of land use and habitat geology . also soil samples from different depth and habitats were collected in order to analyze and physico - chemical parameters such as soil texture , PH, salinity, Na+ Mg++, Ca++, and CaSo4.
Meteorological factors were studied using data from nearest station. Also data layers of Jamab used to provide isotherm, isoyet, and climate maps for *Astragalus brevidens* .
Here we studied distribution zones of *Astragalus brevidens* in khorassan , companion and vegetation habitat. Furthermore, this factors, we studied about of seed germination, nitrogen fixation, root system, reaction to grazers, plant production Chemical compounds, diseases and pests.

Results and discussion:

Morphological characteristic:

It's a perennial plant that belong to Onobrychium section and plant high varied 20-80 cm at different habitats . life - form of it,s hemicryptophyte (fig 1&2) and have depth root (>2 m) .

Topography:

Results showed that it is altitude ranges between was 1250- 2500 meters and it seems that it is not appeared in > 2500 elevation. However, it is going to be omitted, even in main habitats because of palatability and over grazing. Geographical distribution of *Astragalus brevidens* was determined using available references and field check .
This species exist in all Geographical orientation and slopes of 5 to 70 % . This plant more observed in North and west north orientation. survey results showed that , habitats of Astragalus brevidens was limited of in mountain zones of North and center Khorassan. Many of cousion plants (such as : *Onobrychis cornata , Astragalus heratensis Acantholimon spp*) and grasses for exampel *Bromus kopetdaghensis , Agropyron spp , Festuca ovina and Dactylis glomerata* are the most indicators of component species with As. brevidns in Khorassan range land.(fig 3 &4) .

Phenology:

Results of marked plants in 3 habitats showed that vegetation growth initiated in early March. Increasing temperature and humid exist in early April in habitats be caused to plant growth continued to early June. Flowering stage initiated in mid June and pollination occurred 7-10 days after and then gradually completely flowered in early July.
Since it is determinate, vegetation growth continued during flowering stage. Seed setting initiate from mid July and gradually ripen in early Aug an then shed in mid Sep.
Vegetative and reproductive over lapped during plant growth (fig 5).

Metorology & Climatology:

Astragalus brevidens has favorably disturbed in cold-semi-arid and mountain climates.
According to Jamab data layer, Annual rainfal at different habitats is changed between 200-550 ml/per year and Annual temperature is 5.2 - 14.3 degree centigrade. Analysis of Meteorological nearest station data showed in table (1) .

Soil and land use characteristics:

The most habitats of *Astragalus brevidens* have been located at Binalood and kopedagh geological formation. This regions have high mountains and calcaric regosols and little alkaline more habitats has been non Gyps and are little alkaline in vegetative region of Astragalus. texture of soil Was determined silty , silty-loam , loam,sand loam and clay loam.(table 2) .

Associated plants:

This plant was little observed as a dominant species in range land and Many of chosion plants (such as: *Onobrychis cornata , Astragalus heratensis , Acantholimon spp*) and grasses for exampel *Bromus kopetdaghensis , Agropyron spp , Festuca ovina and Dactylis glomerata* are the most indicators of component species with As. brevidns in Khorassan range land.

Seed germination:

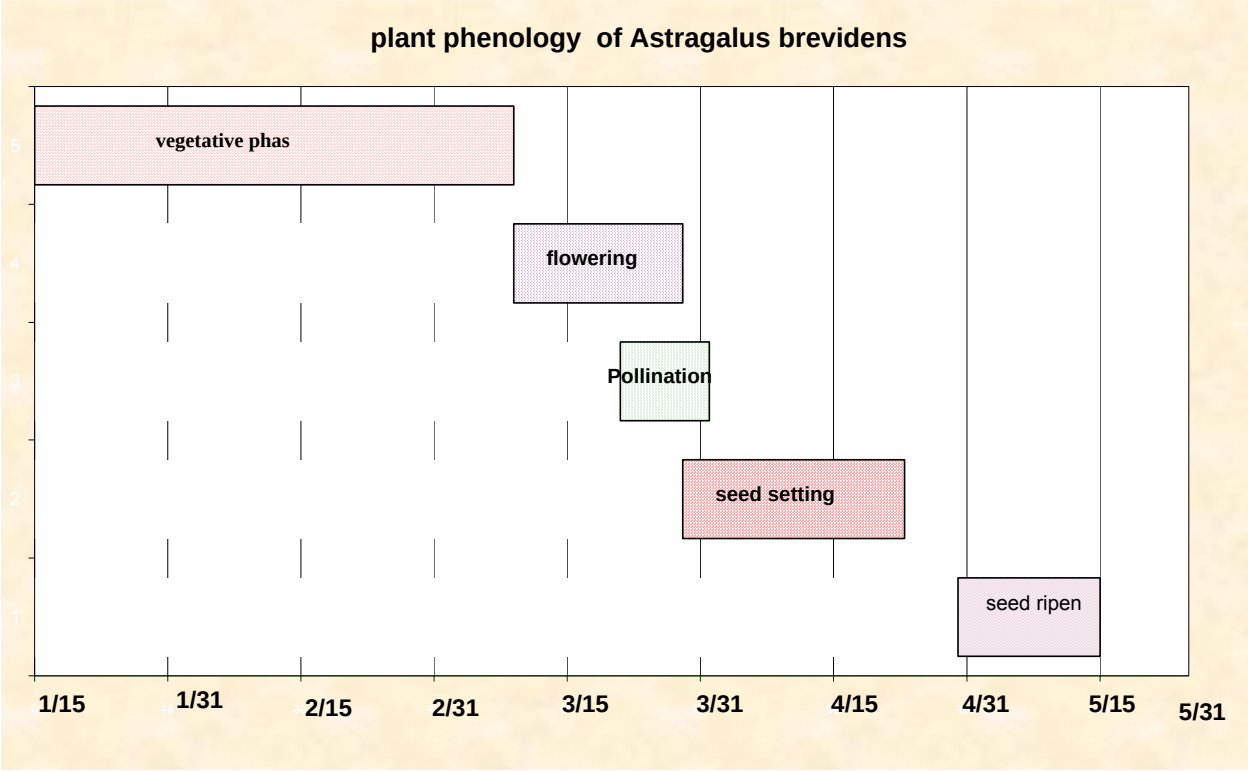
Seeds of plant have hard coat and seed germination increased with scarification. Results showed that the most percentage and rate germination was occurred in 15 degree centigrade.(fig 6) .

Table (1) :Meteorological nearest station data in some of *Astragalus brevidens* habitats.

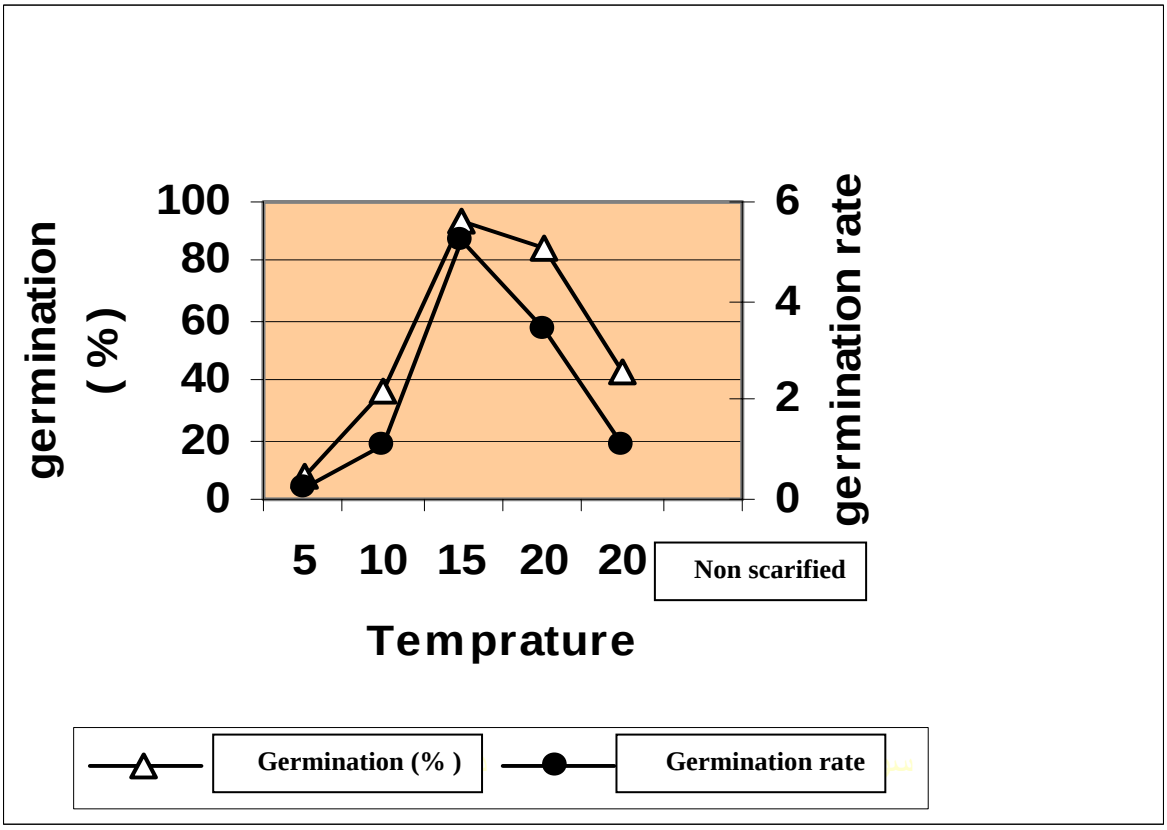
year	Dray period	Rain		Temperature			Characteristic			Station
		Max	mean	mean	max	min	Altitude	North Lat.	East Lon.	
1352-1380	4/5	639/5	351/3	9/6	39	-19	1885	36°20´	59°12´	Zoshk
1363-1380	4/5	534	232/6	8/6	35/5	-21	1870	36°49´	59°22´	Mareshk
1353-1380	4	514	325/8	8/9	46	-37/5	1495	37°35´	58°27´	Shamkhal
1356-1360	5	426/3	277/8	13/8	42	-13	1240	36°10´	59°22´	Torogh

Table (2) : Soil chracteristic in some of *Astragalus brevidens habitats in Khorassan*

Ca Meq/lit	**mg Meq/lit**	**Cl Meq/lit**	**Na Meq/lit**	**PH**	**Organic mater (%)**	**Ec Ds/cm**	**Lim (%)**	**Gyps**	**Texture**	**Habitat**
3/5-8/5	**2-3**	**0-5**	**7-30**	**6/5-7/2**	**2/8-3/3**	**/5-/8**	**2-10**	**-**	**Silt loam**	**Tandooreh dargas**
4-7	**3-4**	**2/5-5**	**14-75**	**7/3-7/5**	**1/2-1/7**	**/6-1**	**37/3-8/2**	**-**	**Silt loam Sand loam Loam**	**Binalud**
1-4	**3-4/5**	**2/5**	**5/5-12/5**	**7/3-7/5**	**/3-1/6**	**/5-1/1**	**3/9-4/4**	**-**	**Silt loam**	**Torogh**
4-12	**3-4**	**2/5**	**8/5-11**	**7/2-7/8**	**1-3/2**	**/5-1/1**	**30/6-17/5**	**-**	**Loam Clay loam Silt loam**	**Hazar masjed**



Fig(5): Phenology of *Astragalus brevidens*



Fig(6): rate and seed germination of *Astragalus brevidens* –(*Standard errors 5%)*

Fig(2) : Astragalus brevidens

Fig (1) : hemicryptophyte life-form in

Fig(3) :
Mountain habitats of Astragalus brevidens in North of Khorassan

Fig(4) : habitats of Astragalus brevidens in Hezar masjed

Conclusion:

geographical distribution of *Astragalus brevidense* limited in Russia, Turkmenistan and North East of Iran. Its palatability is high so has been disturbed through grazing and only was seen in protected areas and margin of dry land farms .It's habitats are mountains of North of Khorassan where the climate is cold and ultra cold – semi arid and semi wet with mean annual temperature of 5-14^{oc} and mean annual precipitation of 200-550mm . It's altitudenal range was 1250-2500 meters and more was seen in North-facing slopes. The soil was non-saline and non-gypsic, pH= 6.5-7.8 with high amount of organic matters and texture of loam, silt loam and clay loam. Germination rate increased when seeds scratched. Its annual life period is120-130 days that start from early March to mid July which vary in different habitats. Active nitrogen fixative nodules in primary roots of seedling and also in the secondary roots of adult plants was observed. Crude protein in flowering stage was 20.4 which is comparable with Alfa-Alfa.The most important pests and diseases were Bruchos sp., legominosae aphis and uromyces Punctatus.

Resources:

1 - Amirabadi zadeh , h.. 2001 . vegetaion types of Ghouchan - Dagas . Reserch Institute of Forest and Range lands .

2 - Baskin , C . C . Baskin , J.m and Quarter man . E. 1972 . Observation on the ecology of *Astragalus tennessenis* . Am mia lant nat.vol 88 . No 1 : 167-182.

3 - Green , T.W and G.E , Bohant . 1975 . The polination ecology of Astragalus cibaricus and *Astragalus utahensis (Leguminosae*) . Amer. J. Bot . 62 : 370 - 25

4 - Massoumi A,A. 1988 . Astragalus in the world Research Institute of forest and Range land

5 - Podlech . D . 1986 . Thaxonomic and phytogeographicas problem in *Astragalus* of the old world and south west asia . pro. Roy. Soc. Edinbergh 89 :37-43.

6 - Yokota, A.Sanda , H.Hisamatus, M. Arki , M and Cho , HJ . 1994 . Enerobacter coloacae A105 , isolated from the surface of root nodoles of *Astragalus sinicus cv gapan* stimulate nodolation by Rhizobium hukuiibu renge . Journal of fermentation and Bioengineeraring .

7- Никитин , в. В. Гелбдиханов, А. М. 1988. Опркеделитель Растений Туркменистана