# GROWING OF SAINFOIN (Onobrychis viciifolia Scop.) ON SOILS DERIVED FROM DIFFERENT MAIN ROCKS IN EASTHERN BLACKSEA REGION OF TURKEY

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## ABSTRACT

This study was carried between 1995-96 years in Değirmendere watershed creek in Trabzon that is located in northeast of Turkey. The aim of this study is to determine growing potential of sainfoin (O. Viciifolia Scop.) on soils that was derived from different parent materials has different reaction, and contribute on social- economic condition of public. Study area was selected as a model plan for east black sea region. For this purpose, 8 experimental blocks consisting of 4 plots each were established on different parent materials, such as Dasite (D), Andesite (A), Limestone (L), in september 11th, 1995. After that, 32 soil profiles were dug according to factorial - trial design, and destroyed and undestroyed soil samples were taken from 0-20 cm., 20-50 cm. depth steps. Thirteen physical properties of soil were analyzed in laboratory. After ground cover was cleaned nursery beds were established, and 8.5 kg/da sainfoin seeds were sowed into nursery beds in september 15 th, 1995.

During the growing season, it was not used any organic and inorganic manure, and the experimental blocks were not irrigated and hoed. Sainfoin was cut from soil survey at the beginning of bloomy ( 20-40 %) in may 28 th, 1996, and green-forage yields and oven-dry forage yields of sainfoin were measured in laboratory. As a result, average green- forage yields were measured, 151. 26 (D), 205. 76 (A), 224. 73 (L) kg / da; average oven-dry forage yields were measured 64. 60 (D), 85. 90 (A), 95. 10 (L) kg / da; average plant heights were measured 12. 43 (D), 17. 69 (A), 25. 13(L) cm.; average roots ratio were measured 13. 64 (D), 40. 81(A), 24. 83 (L) kg / da.

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## 1. DEFINITION OF STUDY AREA

The study area is located in Limni river basin which is 16 km far away from Trabzon city centre. It is between 40º 53' 45"-40º 54' 22" N latitudes and 39º 35' 36"- 39º 41' 22" E longitudes.

The climate of East Black sea region is humid with short cold winters and relative moisture is very high in spring and fall, and hot summers (Erinç, 1984). Annual average values of yearly max., min. Temperatures of study areas are 23.1, 13.8, and 6.6 ºC respectively and annual precipitation is 770.4 mm.

## 2. MATERIALS AND METHODS

8 Experimental blocks consisting of 4 plots each were established on different parent materials, such as dasite (D), andesite (A), limestone (L) in September 11$^{th}$, 1995. After that 32 soil profiles were dug according to factorial-trial design, and destroyed and undestroyed soil samples were taken from 0-20, 20-50 cm depth steps. Thirteen physical properties of soil such as, water holding capacity, colloid / moisture equivalent ratio, bulk density, soil particle density, erosion ratio, sand, silt and clay ratio, loss on ignition and pH ratio were determined in laboratory (Gülçür, 1972).

After ground cover was cleaned nursery beds were established, and 8.5 kg / decaare sainfoin seeds were sowed into nursery beds in September 15 th, 1995. During the growing season it was not used any organic and inorganic manure, and the experimental blocks were not irrigated and hoed. Sainfoin into quadrat (40X40 cm$^2$) was cut from soil survey at the beginning of bloomy (20-40%) in May 28$^{th}$, 1996. Sainfoin was dried at 70 ºC up to 12 hours in dry- board, and samples of sainfoin were measured to determine oven-dry weight (Manga, 1978 ).

## 3. CONCLUSION

It was statistically determined import differences among soil properties except silt ratio. The highest amount of water holding capacity, and clay ratio were measured on soils derived from dasite (D) parent material, and the highest infiltration ratio and pH were measured on soils derived from limestone parent material. It was concluded that soils of study area was sensible to erosion according to the erodibilty index (Table 1).

Growing of sainfoin was become very slowly between September and December, 1995, but sainfoin growed very rapidly in April and May. We measured 12. 43 cm, 17. 69 and 25. 13 cm average plant heights on dasite, andesite and limestone parent materials respectively. Average green forage yields were measured 151. 26 kd / da (D), 205. 76 (A), 224. 73 kg / da (L);

Average oven - dry forage yields were measured 64. 60 kg / da (D), 85. 80 (A), 95. 10 kg / da (L); Average roots ratio were measured 13. 64 kg / da (D), 40. 81 (A), 24. 83 kg / da (L). It was determined line correlation between soil pH and forage yield of sainfoin (Table 2.)

## 4. DISCUSSION

Growing of sainfoin was become very slowly the first month. Poor root and plant growth often occured, because we did not to strive cover-living periodically between September and December, applying any care methods like cover striving, watering and hoeing and did not use any organic and inorganic manure before or after sowing.

Care methods, mucking and soil properties especially soil reaction and sand ratio are very important on plant growth of sainfoin. It has been reported that sainfoin has very well growing on sandy soils derived from limestone main rock (Okatan &Yuksek,1997 ). We can say that if we apply care methods with manure by periodically, sainfoin can be grown very well in Limni river basin.

## 5. REFERENCES


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## APPENDİX

Table 1. Some Physical Properties of Soil in Study Area

| Soil Properties | Parent Material | N | X | Sx | F Test | Significant Level | Duncan Test (Differences of Samples) | |
|---|---|---|---|---|---|---|---|---|
| Sand (%) | Dasit | 3 | 53. 40 | 0. 680 | 138. 94 | 0. 000 | D-A* | D-A** |
| | Andesite | 3 | 64. 83 | 0. 961 | | | D-L* | D-L** |
| | Limestone | 3 | 71. 23 | 0. 611 | | | L-D* | L-D** |
| Silt (%) | Dasit | 3 | 17. 66 | 0. 753 | 2. 01 | 0. 2137 | N.S | N.S |
| | Andesite | 3 | 17. 46 | 0. 470 | | | | |
| | Limestone | 3 | 18. 33 | 0. 145 | | | | |
| Clay (%) | Dasit | 3 | 28. 93 | 1. 433 | 59. 07 | 0. 0001 | D-A* | D-A** |
| | Andesite | 3 | 17. 70 | 1. 429 | | | D-L* | D-L** |
| | Limestone | 3 | 9. 66 | 0. 721 | | | L-D* | L-D** |
| Water Holding Capacity (%) | Dasit | 3 | 56. 83 | 2. 390 | 51. 35 | 0. 0002 | D-A* | D-A** |
| | Andesite | 3 | 42. 90 | 0. 873 | | | D-L* | D-L** |
| | Limestone | 3 | 35. 13 | 0. 702 | | | L-D* | L-D** |
| İnfiltration | Dasit | 3 | 32. 06 | 1. 332 | 168. 21 | 0. 0000 | D-A* | D-A** |
| | Andesite | 3 | 45. 60 | 1. 446 | | | D-L* | D-L** |
| | Limestone | 3 | 63. 71 | 0. 792 | | | L-D* | L-D** |
| Permeability | Dasit | 3 | 13. 36 | 0. 578 | 2. 22 | 0. 1893 | N.S | N.S |
| | Andesite | 3 | 15. 43 | 1. 186 | | | | |
| | Limestone | 3 | 16. 23 | 1. 098 | | | | |
| Soil Particle Density ($g/cm^3$) | Dasit | 3 | 1. 06 | 0. 024 | 9. 37 | 0. 0142 | D-A* | D-L** |
| | Andesite | 3 | 1. 00 | 0. 005 | | | D-L* | |
| | Limestone | 3 | 0. 98 | 0. 003 | | | | |
| Bulk Density ($g/cm^3$) | Dasit | 3 | 2. 63 | 0. 011 | 18. 73 | 0. 0026 | D-A* | D-A** |
| | Andesite | 3 | 2. 53 | 0. 014 | | | D-L* | D-L** |
| | Limestone | 3 | 2. 56 | 0. 050 | | | | |
| pH | Dasit | 3 | 6. 15 | 0. 028 | 365. 20 | 0. 0000 | D-A* | D-A** |
| | Andesite | 3 | 6. 48 | 0. 015 | | | D-L* | D-L** |
| | Limestone | 3 | 7. 55 | 0. 057 | | | L-D* | L-D** |

N: Number of samples, X: Aritmetric average of samples, Sx: Standart Errors of samples,
*: Significant Level 5 %, **: Significant Level 1 %, N.S.:Non-Significant

Table 2. The Results of Some Yield of Sainfoin: Green-Oven Dry Weigh, Ashes Ratio and Plant Length

| Yield Properties of Sainfoin | Parent Material | N | X | Sx | F Test | Significant Level | Duncan (Differences of Samples) | |
|---|---|---|---|---|---|---|---|---|
| Green Forage Yield (Kg/da) | Dasit | 3 | 151. 26 | 3. 460 | 164. 89 | 0.0000 | D-A* | D-A** |
| | Andesite | 3 | 205. 76 | 3. 002 | | | A-L* | A-L** |
| | Limestone | 3 | 224. 73 | 2. 339 | | | D-L* | D-L** |
| Oven-Dry Forage Yield (kg/da) | Dasit | 3 | 64. 60 | 1. 247 | 152. 21 | 0.0000 | D-A* | D-A** |
| | Andesite | 3 | 85. 90 | 1. 504 | | | A-L* | A-L** |
| | Limestone | 3 | 95. 10 | 1. 001 | | | D-L* | D-L** |
| Root Yield (Kg/da) | Dasit | 3 | 13. 64 | 0. 851 | 48. 99 | 0.0020 | D-A* | D-A** |
| | Andesite | 3 | 40. 81 | 2. 498 | | | A-L* | A-L** |
| | Limestone | 3 | 24. 83 | 2. 110 | | | D-L* | D-L** |
| Ashes Ratio (%) | Dasit | 3 | 7. 16 | 0. 609 | 28. 55 | 0.0090 | D-A* | D-A** |
| | Andesite | 3 | 14. 46 | 0. 669 | | | A-L* | A-L** |
| | Limestone | 3 | 11. 42 | 0. 646 | | | D-L* | D-L** |
| Plant Length (cm) | Dasit | 3 | 12. 43 | 0. 491 | 23. 76 | 0.0010 | D-A* | D-A** |
| | Andesite | 3 | 17. 63 | 1. 354 | | | A-L* | A-L** |
| | Limestone | 3 | 25. 13 | 1. 752 | | | D-L* | D-L** |

N: Number of samples, X: Aritmetric average of samples, Sx: Standart Errors of samples,
*: Significant Level 5 %, **: Significant Level 1 %., N.S.:Non-Significant