Biological Forum – An International Journal **6**(2): 94-97(2014)

ISSN No. (Print): 0975-1130
ISSN No. (Online): 2249-3239

Effect of Tea Bushes on Soil Physics in the Forest areas Turned in low land Siahkal Forests

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(Received 08 August 2014, Accepted 16 September, 2014)

ABSTRACT: Conversion of forest land to other land uses is one of the most important human interference in natural ecosystems, which is effective on ecosystem processes, particularly soil. In order to study the effect of the tea bushes on soil physics in forest areas turned in low land Siahkal Forests, Series 3 Toshi in the Siahkal forests area in Gilan. Soil sampling is done by using systematic sampling method, and the depth of 0 to 30 cm. In total, 40 soil samples (20 samples for each region), to measure parameters of the soil were sampled and were transported to the laboratory. After normalization of the data, by using the Kolmogorov-Smirnov test, using the software SPSS 18, to study and compare data related to the parameters studied of soil in two areas of degraded forest and tea garden, Non-paired t-test was used. The results showed that, in both two areas of degraded forest and tea garden, soil type was clay loam, and the percentage of clay and sand in the forest is more than tea gardens and the percentage of silt in the forest is less than tea gardens. Apparent specific weight of soil in forest areas is more than tea garden areas and, conversely, the average actual specific weight, porosity in the tea gardens is more than the forest area, which represents an increase in soil quality due to conversion of forest land to the tea garden in the forest areas destroyed in downstream areas of forests in this region.

Keywords: land use change, forest, tea, soil, Low land Siahkal forests

INTRODUCTION

Soil quality is considered as one of the most important factors considered in the evaluation of soil management and biological realm sustainability. Soil properties have been heavily influenced by soil management systems and land use. Land use change on ecosystem processes, especially carbon and nitrogen mineralization rate, is effective. Effect of different land uses, with the addition of their litters on the soil surface, in natural forests and tea gardens can be positive or negative impact on the physical, chemical and biological properties of the soil. Changes in land use and agricultural practices in the virgin lands lead to the reduction of entry of the crop residues to the soil. Decrease in carbon stocks in soil leads to a decrease in microbial biomass and activity of micro-organisms in soil. This important part of soil plays an important role in organic matter decomposition and return of necessary nutrients. Land use change from forest to agriculture, especially in steep terrain and erodible lands, is a major problem, which with direct impact on soil quality parameters in addition to the damage and loss of potential of the soil, damage through increasing soil Erodibility (Marinari *et al.*, 2006).Soils of forest lands, due to high organic matter, and suitable buildings, have always been considered, but changes in management and their use and tillage practices, mainly huge impact on the amount of organic matter and other physical and chemical properties of the soil (Li et al., 2007. Yimer *et al*, 2007). Therefore, land use change from forest to agriculture reduces soil organic matter and In contrast to that the conversion of agricultural lands to natural vegetation can lead to increase of soil organic matter (Dawson, Smith, 2007. Stoate *et al.*, 2001). The results of forest land use changes on some soil physical and chemical properties in part of Berenjestanak watershed in three users of the forest, dry land farming (wheat) and garden indicated that the amount of organic matter in the agricultural lands and garden, respectively, 44.24 and 45.45 percent in layer 0-10 cm, 42.69 and 43% in the layer 10-20 cm was lower than forested land. The maximum total nitrogen in the layer 0-10 cm in the forest land equal to 30 percent, its lowest in the layer 10-20 cm in the garden lands was observed equal to 0.19 percent (Soleymani and Azmoodeh, 2010). Given the importance of land use changes on soil properties, this study examines the impact of conversion of forest land to the tea gardens in Series 2 Gamble in the Gilan province.

MATERIALS AND METHODS

Series 3Toshiwith area of 2028 hectares is of the forests of south-eastern province of Gilan and a part of jurisdiction of the Department of Natural Resources of Siahkal. It is located on between Longitude 490 46' 015" and latitude 00 3' 37". The minimum and maximum its height from sea level is equal to 100 to 100 m, and its general direction is north. The average annual rainfall is 1264.5 mm and the mean annual temperature is 16 °C (Untitled, 2007).

Fig. 1. Geographical location of the area studied.

The systematic random sampling method from the soil of two regions was used. Thus, after design of a grid 50 × 50 mm, 30 points for each region were selected, after a survey of the fields studied, sampling was done from 20 points in each region of 0 to 30 cm depth. The samples of soil (40 samples) were extracted transported to the laboratory, and organic carbon by using block-Vakly method, soil nitrogen by using Kjeldahl method and phosphorus of the soil by using flame photometry method were extracted (Zarin Kafsh 2001, Salardini 2005). Analysis and comparison of mean data, using the software SPSS 18 and unpaired t-test was performed, and graphs were plotted in Excel software.

RESULTS

1. Soil Texture: The results of soil samples to determine soil texture in the areas of forests and tea gardens, showed that, in both areas, soil was sandy loam, and between the areas studied, no significant differences in terms of the soil type was observed (Fig. 2) (Sig = 0/09).

2. Bulk density of soil: The results of the disintegration of variance and comparison of mean data by using non-paired t-test showed that the Apparent specific weight of soil in tea gardens has a significant difference in the 99% confidence level with forest areas (Sig = 0/000) (Fig. 3).

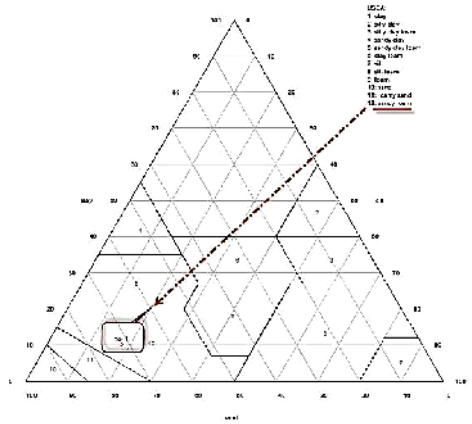

Fig. 2. Types of soil texture in forests and tea gardens.

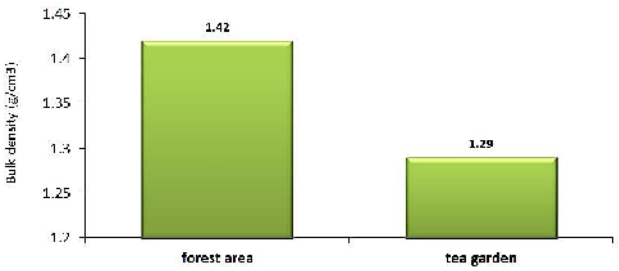

Fig. 3. Averagebulk density of soil in forests and tea gardens.

3. Actual specific weight of soil: The results of the disintegration of variance and comparison of mean data by using non-paired t-test showed that the actual specific weight of soil in tea gardens has a significant difference in the 99% confidence level with forest areas(Fig. 4)(Sig = 0/000).

4. Soil porosity: The results of the disintegration of variance and comparison of mean data by using non-paired t-test showed that the Percentage of Soil porosity in tea gardens has a significant difference in the 99% confidence level with forest areas (Fig. 5) (Sig = 0/000).

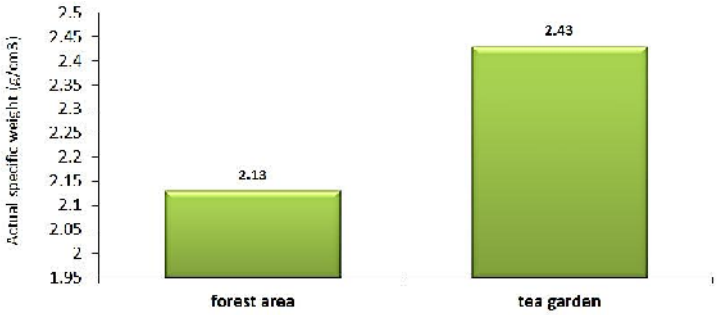

Fig. 4. Average actual specific weight of soil in forests and tea gardens.

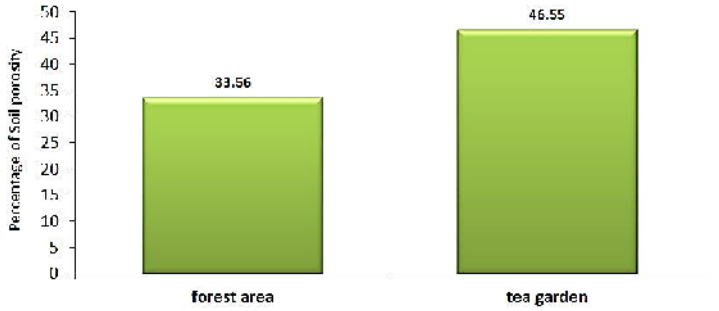

Fig. 5. Average Percentage of Soil porosity in forests and tea gardens.

DISCUSSION AND CONCLUSIONS

The results of this study showed that land use change had no significant effect on the soil texture of this region. Soil texture in both forests and tea gardens was clay loam. Given that conditions and environmental factors were the same in both cases, the presence of such texture in these areas is a sign of high productivity (Elias Azar, 2005).However, in some places, with increasing slope, soil texture changed from clay loam to clay, but much of this change was not significant. This is due to the presence of lower organic material under the effect of washing in the classes with upper slope in comparison with the classes with lower slope in the areas studied (Lee, 2001).The average Apparent specific weight of soil in the forest 1.43 and 1.29 for tea gardens, the actual average density of soil in forest 2.13 and2.43 for tea gardens, and the average the percentage of porosity of the soil in the forest 33.56 and 46.55 for tea gardens was obtained. The results of the data analysis of apparent and actual specific weight of soil and the percentage of soil porosity between forest and tea garden areas studied showed a significant difference at 99% confidence level. High Apparent bulk density in forest than in tea garden areas and, conversely, low actual density and porosity in forest soils than tea garden areas show more soil compaction in the forest areas in comparison with the tea gardens. This may be because, according to the forest area studied in this research is one of the forests destroyed by rural people with species of hazel, hornbeam and Diospyros lotus, and it is located on a rural road with beautiful natural landscapes, and on weekends it is visited by many tourists. These factors cause soil compaction and erosion in the forest more than the tea garden areas and the porosity and influence of water has decreased, and in some cases, it causes sewage, which in turn leads to erosion (Azmoodeh and Soleymani, 2010. Boix-Fayos *et al*, 2001).Meanwhile that the tea garden areas in these areas was surrounded, and with evergreen and annual autumn of their leaves, while providing needed nitrogen for soil fertility, it has caused more water permeability than the forest areas, while reducing apparent bulk density, soil porosity is increased (Elias Azar, 2005).This issue doubles the importance of the existence of the tea gardens in the forest areas destroyed to conserve soil and water and maintain soil fertility.

REFERENCES

Elias Azar, Kh. (2005). General pedology. Urmia University Press, p 382.

Untitled, (2007). Booklet of Forestry plan of the series 2 Gamble. A department of the Natural Resources of the Lahijan. p 356.

ZarinKafsh, M., (2001). Forest pedology, Publication of the Research Institute of Forests and Rangelands, No. 292, page 361.

SalarDini, leader, Ali. (2005). Soil fertility. Tehran University Press, P 414.

Soleymani and Azmoodeh (2010). The role of land use changes on some physical and chemical properties and soil Erodibility, *Geography Research*, No. **74**, pp 111-124.

Boix-Fayos, C., A. Calvo-Cases, A.C., Imeson and M.D. Soriano-Soto, (2001). Influence of Soil Properties on the Aggregation of some Mediterranean Soils and the Use of Aggregate Size and Stability as Land Degradation Indicators, Catena, **44**, pp. 47-67.

Dawson, J.C. and Smith, P. (2007). Carbon Losses from Soil and its Consequences for Land Use Management, Sci. and Total Environ., **382**: 165-190.

Li, X.G., Li, F.M., R. Zed, R., Zhan,Z.Y and Singh, B. (2007). Soil Physical Properties and Their Relations to Organic Carbon Pools as Affected by Land Use in an Alpin Pasture land, *Geoderma*, **15**: 98-105.

Marinari, S., R. Mancinelli, R Campiglia,E and Grego, S. (2006). Chemical and Biological Indicators of Soil Quality in Organic and Conventional Farming Systems in CentralItaly, *Ecol. Indicators*, **6**: 701-711.

Stoate C., Boatman, N.D.,Borralho, R.J., Rio Carvalho, C., Snoo, D and Eden, G.R. (2001). Ecological Impacts of Arable Intensification in Europe, *Journal of Environmental Management*, **63**: 337-365.

Yimer, F., Ledin, S and Abdelkadir, A. (2007). Changes in Soil Organic Carbon and Total Nitrogen Contents in Three Adjacent Land Use Types in the Bale Mountains, South-Eastern Highlands of Ethiopia, *Forest Ecology and Management*, **242**: 337-342.

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