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STUDY OF *MYRSINE CAPITELLATA* WALL IN FOREST AREAS OF PAIYUNPATA VILLAGE, BAGLUNG, NEPAL

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Abstract

Present study focuses on ecology of *Myrsine capitellata* Wall. and its rapid decline due to over-exploitation in forests of Paiyunpata Village, Baglung district. Ecological parameters like importance value, species diversity, etc. have been studied. Besides, soil characters and causes and consequences of its deforestation have been discussed. The *Myrsine capitellata* Wall. is important forest component of the study area. Community diversity is less in North facing slope than in south facing slope. Soil is acidic, with high WHC value, low moisture content and sandy type of texture. After this study, it is recommended to begin for the extensive plantation and other conservation efforts of *Myrsine* before being extinct.
Key words: Setikath, deforestation, conservation, Nepal

Introduction

Forest is the natural renewable resource, which provides a sustained economic and social contribution for the development of the country. Forest is major factor to environment concern, which provides habitat for wildlife, help in balancing the gaseous cycle of atmosphere and tend to increase local rainfall and water holding capacity of soil. It maintains soil fertility, regulates earth's temperature and water cycle, checks soil erosion, landslides, shifting of sand and reduces the flood havoc.

The forests of Nepal are the second largest natural resources after water (UNEP, 2001). However, during the last four decades, rapid forest decline began from 1950s. After nationalization of forest, the forest area has decreased considerably due to uncontrolled use of forests and their products. Compared to 6.4 million hectares of forest in 1964, the current forest

area is 4.27 million hectares i.e. 29% of the country's total area (DFRS, 1999). The current annual rate of deforestation is estimated to be 1.7 percent with 2.3 percent in hills (MOPE, 2000, Dhoubhadel, 2001). This is mainly due to fault government policy and illegal logging and forest clearance for agricultural land. Uncontrolled but sometimes a well planned clearing of forest for various purposes such as shifting agriculture (*Khoriya*), fire wood, fodder, timber, grazing etc. is known as deforestation, which is the human encroachment on forest.

Present study is mainly focused on the deforestation of *Myrsine capitellata* Wall. belonging to Myrsinaceae family and locally known as *Seti Kath*. The plant species has been cleared day by day in the study area for firewood, *thankra* (Supports for climbers), *muhura* (Stick for harvesting for cereals), handles of sickle, hammer, spade and axe, and thus the ground cover of the forest is emptied for leaf litter collection. This forest of *Myrsine* is going to be extinct soon if the deforestation trend will further be like this. It will bring the environmental problems too. That is why the plant species is selected for the study.

Fuel-wood accounts for 78 percent of energy consumption, but not all firewood comes from forest; agro-forestry sector shares some contribution to it. Consumption has increased along with population growth (MOPE, 2001 & UNEP, 2001). Variety of species encountered in a plant community with respect to their relative importance is the species diversity of that community.

Study of these parameters with soil properties had given clear ecological importance of the *Myrsine capitellata* Wall. in the forest of the study area.

Study area

Present study was carried out at Paiyunpata Village of Baglung district as shown in Figure 1. It lies to the southern part of Baglung bazaar. There is Narayansthan Village to the eastern side of the study area. Amalachour Village is located to the south and Bhakunde Village is located in the west of study area while Kaligandaki River lies to the northern part.

There are 500 households in Paiyunpata Village. Total population is 2705 there (CBS, 2005). Main occupation of the people is farming. Few people are involved in armed forces, teaching, government jobs and social works.

The inhabitants of the study area are mainly Brahmin, Chhetri, and marginalized social groups called *Dalits (*traditionally called *Damai*, *Sarki* and *Kami)*. The Dalits are the majority inhabitants in ward no 3, 5 and 8. There are Brahmin and Chhetri in other wards.

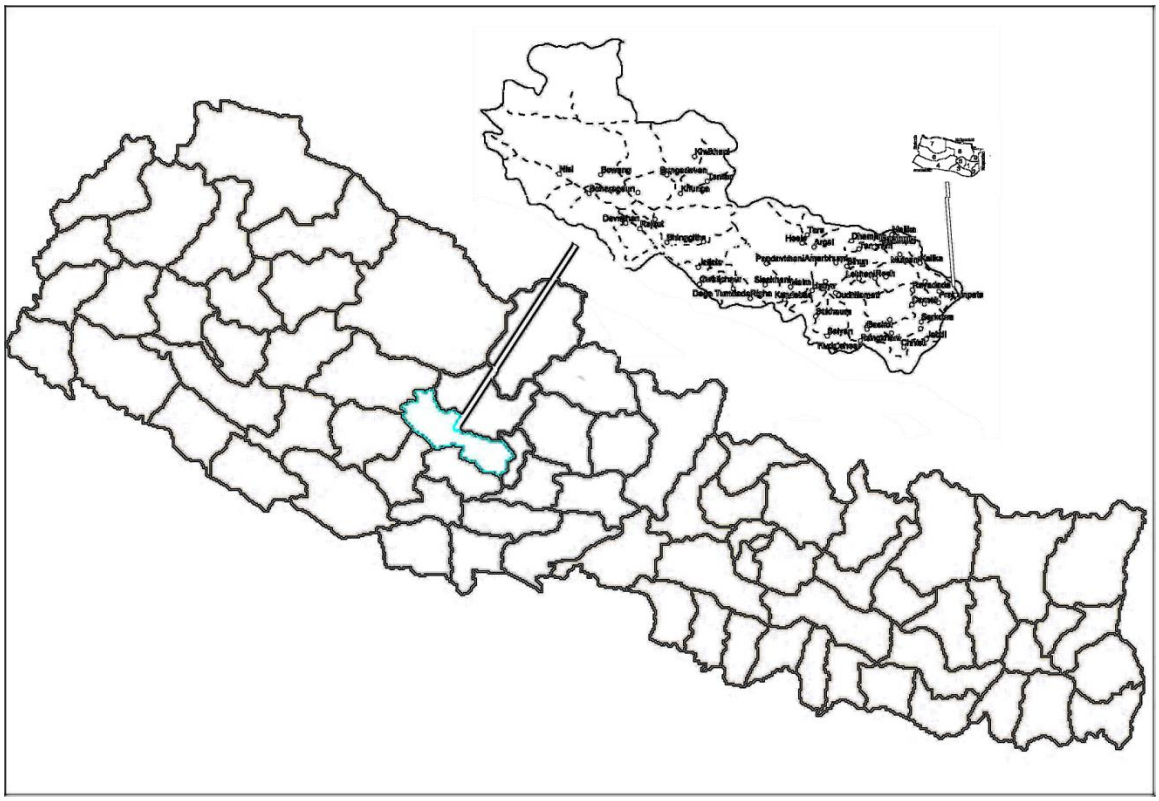

Fig 1: Schematic map of the study area

The main food crops of the area are rice, wheat, maize and millet. Animal husbandry is the common agricultural practice of the inhabitants. For last few years only, there is availability of electricity. But it is only for lighting purpose in some of the villages of Balewa area. People cannot afford petroleum gases and other energy sources for cooking and heating.

Paiyunpata Village; the southern part of Baglung district by the side of Kali-Gandaki River, lies in sub-tropical belt (Chaudhary, 1984) and constitutes the Saal Forest. At the top of the hills, the forest is mixed with *Schima-Castanopsis* type. However, at the higher elevations, coniferous forest consisting *Pinus roxburghii, Tsuga demosa, Taxus baccata* etc with *Rhododendron arboreum* and *Quercus* species are found in western side of study area. *Myrsine capitellata* Wall. is found mixed with *Schima-Castanopsis* forest**.**

Population growth is the major cause of destruction of *Myrsine.* According to the older generation of the inhabitants of the area, there was a dense forest of this species in this area. As population increased, people encroached upon the forest for cultivation. There was practice of shifting cultivation. Later on this agricultural system is followed by other subsistence farming. Thus the forest of *Seti Kath* has been destroyed for all of these farmlands.

Methodology

1.Sampling

As stated in the study area section, the forest area is Schima-castanopsis type. However, the sites dominated by *Myrsine* was selected for the study. For vegetation study, stratified

random sampling method was employed in two sites of the forest i.e. one in north facing slope and the other in south facing slope. In each case, 10 quadrats of 10×10m were laid down with convenient sampling. The forest area was 50/ 50 *Ropani* in each slope. Vegetation study was focused on tree species only.

Soil samples were collected by following the methods described by Trivedi and Goel, 1986. From each vegetational sampling plot, about 1kg of soil up to the depth of 10cm was collected by making four holes and it was collected in polythene bags and mixed homogenously. Each of the bags was sealed tightly.

For the information related to deforestation, its causes and consequences; semi structured questionnaires were used among 50 inhabitants sampled randomly by lottery system. The persons selected by the people for forest protection (*Ban pale*) and some elderly people were the samples for group discussion. Group discussion was focused to support the collection of the information about the *Myrsine* forest at present and past.

Sampling was done during September/October 2013.

3. Data collection

i. Vegetation survey:

Individuals of every tree species were recorded from the samples for frequency and density. Cover of each tree species (>5%) was estimated.

ii. Social survey:

Information related to deforestation along with its causes and consequences was gathered using semi-structured questionnaire from (10%) sampled households.

iii. Classification:

The species enumerated in each quadrat were grouped together to determine frequency, density and coverage. Similarly social data were grouped together according to the category.

Herbarium species of the enumerated species were prepared. They are deposited in the Botany Department, Prithvi Narayan campus, Pokhara. The plant species were confirmed from the villagers for local names and then identified for Botanical names with the help of literatures; Manandhar, 2002 and Stainton, 1988.

2. Data analysis

The vegetation data were analyzed quantitatively for density and frequency using Mishra (1968). Important value index was calculated by adding the values of relative density, relative frequency and relative cover.

Species diversity was calculated by using following formula (Margalef, 1968) as used by Pathak, 1999.

$$H = -\sum \left(\frac{ni}{N}\right) \text{Ln} \left(\frac{ni}{N}\right)$$

Where,

H = Shannon index of general diversity

ni =Important value index of each species

N=Total IVI of all species.

Soil pH, the water holding capacity, soil texture, and moisture content were analyzed in two sites of the study area using Zobel et al. (1987).

Result

Socioeconomic status

Setikath (*Myrsine capitellata* Wall) was recognized by 100% respondents in the study site. *Setikath* forest was a dense forest and it is rare at present. The parts of the plant were used as fuel wood (100%), *Thankra* (supports for climbers , 90%), *Muhura* (Sticks for harvesting crops, 90%) and fodder (Rarely, 10%), and dry leaves were used as litter for composting. 90% of the respondents said it was best for fuel quality and 10 % told as good quality. Regarding chopping quality the wood was 100% best. Plantation is nil till today.

Soil status

In average, soil pH was obtained to be 6.06 indicating acidic nature of soil. Water holding capacity was about 76.66%. Regarding texture, the soil has been found to consist of gravel 17.1%, sand 51.5%, silt 26.2% and clay 2.85%. Thus the soil was mostly sandy. Moisture content was found to be nearly 16.91%. It is drier soil in habitat of the *Myrsine* forest.

Important value and species diversity

Table 1: IVI and species diversity in Norh facing slope

SN	Name of the species	Relative Density	Relative Frequency	Relative Coverage	IVI (ni)	Total IVI of all spp	ni/N	Ln ni/N	ni/N Ln ni/N
1	*Myrsine capitellata* Wall.	37.03	16.67	18.18	71.88	299.92	0.23966391	-1.428517711	-0.342364141
2	*Schima wallichii(DC) Korth*	14.28	16.67	30.3	61.25	299.92	0.204221126	-1.588551923	-0.324415862
3	*Dyospyrus kaki* Thunberg	2.59	5.55	2.01	10.15	299.92	0.033842358	-3.386042067	-0.114591648
4	*Rhododendron arboretum* Sm.	9.74	11.11	15.18	36.03	299.92	0.120132035	-2.119163848	-0.254579466
5	*Castanopsis indica*(Roxb) Miq	3.23	11.11	3.03	17.37	299.92	0.057915444	-2.848771192	-0.164987849
6	*Engelherdtia spicataLesch. ex Blume*	4.54	11.11	10.09	25.74	299.92	0.085822886	-2.45546957	-0.210735485
7	*Eurya cerasifolia*(D Don) Kob.	12.33	11.11	6.06	29.5	299.92	0.098359563	-2.319125509	-0.228108171
8	*Melastoma normale*D Don	14.93	11.11	13.12	39.16	299.92	0.130568152	-2.035859955	-0.265818471
9	*Fraxinus floribunda*Wall	1.28	5.55	2.01	8.84	299.92	0.029474527	-3.524228896	-0.103874978
10	*Sapium insigne (Royale) Benth ex Hook. f*	0	0	0	0	299.92	0	0	0
					299.92	Communitsity Diversity			-2.00947607

In north facing slope, the importance value index of *Myrsine* was highest i.e. 71.88%. *Schima wallichii* occupied next position (61.25), but *Sapium insigne* was totally absent, however, it was present in south facing slope. *Fraxinus floribunda* (8.84) stands as the least important species. *Melastoma* (39.16), *Rhododendron* (36.03), *Eurya* (29.5), *Engelherdtia* (25.74), *Castanopsis* (17.37) and *Dyospyrus* (10.15) are other important species.

Table 2: IVI and species diversity in north facing slope

SN	*Name of the species*	Relative Density	Relative Frequency	Relative coverage	IVI (ni)	Total IVI of all species (N)	ni/N	Ln ni/N	ni/N Ln ni/N
1	*Myrsine capitellata* Wall	13.63	46.59	31.42	91.64	289.31	0.316753655	-1.14963092	-0.275526388
2	*Schima wallichii*(DC) Korth	13.63	8.61	8.57	30.81	289.31	0.106494763	-2.55344	-0.04170639
3	*Dyospyrus kaki*Thunberg	4.54	0.43	7.14	12.11	289.31	0.041858214	-2.48259	-0.016860704
4	*Rhododendron arboretum* Sm.	10.22	7.32	7.14	24.68	289.31	0.085306419	-3.07557	-0.027736783
5	*Castanopsis indica*(Roxb) Miq	13.63	9.04	11.42	34.09	289.31	0.117832083	-2.92237	-0.040320727
6	*Engelherdtia spicataLesch ex Blume*	13.63	6.04	17.14	36.81	289.31	0.127233763	-1.936	-0.065719919
7	*Eurya cerasifolia*(D Don)Kobuske	10.22	6.89	6.42	23.53	289.31	0.081331444	-2.89968	-0.02804842
8	*Melastoma normale* D Don	10.22	7.32	5.0	22.54	289.31	0.077909509	-2.76966	-0.028129629
9	*Fraxinus floribunda* Wall	6.81	3.44	2.85	13.1	289.31	0.045280149	-2.87201	-0.015766014
10	*Sapium insigne*(Royale) Benth ex Hook .f	3.4	1.29	2.85	7.54	289.31	0.02606201	-3.5638	-0.007312983
						289.31	Community diversity		-0.547127958

In south facing slope of the *Myrsine* forest, IVI value of *Myrsine capitellata* Wall. appears to be highest i.e.91.64. *Engelherdtia* contains IVI value around 36.81, *Schima* 30.81 and *Dyospyrus* had values 12.11. *Rhododendron, Eurya , Melastoma, Fraxinus, Sapium* were less important but had values 24.68, 23.53, 22.54,13.1 and 7.54 respectively. The importance value index had the determinant role for species diversity in south facing slope too.

Discussion

Myrsine capitellata Wall is a medium sized soft wooded tree and has been recognized by 100% respondents. Its forest was dense in the past but rare at present. It is used as fuel-wood, supports for climbers, sticks for beating crops during harvesting and rarely as fodder. Leaf litter

is good for composting. Fuel quality was best and chopping quality was 100%. No plantation of the species was in practice. Therefore, both in-situ and ex-situ conservation practice is needed for its conservation. The important feature of this tree is that it becomes dry soon. Therefore, its wood catches the fire easily and produces less smoke. So, the local people of area have been destroying or clearing its forest mostly for firewood.

In summer, when there is lack of straw and other fodders for cattle, people gather the leaves of *Myrsine* with *Castanopsis, Schima* etc. On the other hand, leaf litter on the forest ground is collected by farmers for composting. So, the seedlings also, cannot get nutrients for their development and therefore the regeneration of this species is greatly affected. However, the status of regeneration needs further extensive research to predict about it.

Small trees of *Setikath* are used as poles for climbers (*Thankra),* because they are light and easy to handle, as wall materials etc.

Soil type of the habitat of the *Myrsine* is important for its conservation. It is slightly acidic but nearly neutral with high water holding capacity and texture of sandy type (51.5%), much drier with much less moisture content.

Since the study was carried out in *Myrsine* forest, *Schima wallichii* occupied the second position in both north facing slope but *Engelherdtia spicata* was second in south facing slope. *Sapium insigne* had its presence on south facing slope but absence on north facing slope.

Conclusion

Myrsine capitellata Wall was dominant in the study area since long past, but due to its use for fuel wood, *thankra, muhura*, litter and fodder, it is under the threat of destruction. It needs serious conservation efforts. Regarding IVI value, *Myrsine capitellata* Wall. appears important species even today. Species diversity is less in north facing slope than in south facing slope.

The soil of the habitat is acidic with high water holding capacity, sandy type of texture and with low moisture content. Plantation of *Myrsine* is not common in any part of Nepal known so far. With the search of the conservation efforts of this tree species, plantation of the species proves most important step. Plantation of the tree with the above mentioned characteristics of soil will be beneficial for conservationists. On the other hand, its conservation should follow the uncontrolled harvesting for good chopping quality, and burning for fire wood should be stopped in the forest areas where it is found, especially in sub tropical and temperate forest of central and western Nepal.

Still the *Myrsine* forest is important regarding species diversity over there. *Schima wallichii, Castanopsis indica, Rhododendron arboretum* are other important tree species. Associated with the forest, *Sapium insigne* are also found in the forest type.

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