

Snags or Downed Logs, Which Important in Forest Biodiversity Cas Study; North of Iran, Nooshahr

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Abstract. Dead trees make alive habitat and in addition biodiversity with providing settlement areas for organisms, in the forest ecosystem. On the contrary a tree has a long and productive after life. This study was carried out in Northern forest of Iran, in 50 hectares of virgin forest, Kheiroudkenar district to investigation of Snags and Downed logs effects on biodiversity in fauna and flora. According to the inventory results at stand, from the volume of 349 m³/hac that formed by stand, 16 m³/hac was belong to dead trees, from this percent, 26 % of total volume include Snags and remain, 73 %, related to Downed logs. Results showed that fauna and flora species that lives and settled on Snags and Downed logs is different commonly and this diversity has high dependence to dead trees decay classes. According to the dead to alive stand volume ratio in the study area, about 5%, increasing dead trees volume especially snags is necessary in the region to improve forest biodiversity.

Key words: Snag, Downed log, Biodiversity, Fauna, Flora

1. Introduction

Just because a tree stop living doesn't mean it stops giving to environment around it and it hasn't any organic relations with ecosystem, On the contrary a dead tree is a miniature ecosystem bustling with the activities of thousands of living things. (Lowis, 1998). When a tree dies it may (a) remain standing in forest, in some cases for decades, (b) be uprooted by wind, or (c) progressively break into pieces from damage or decay (Putz et al. 1983, Tyrrell and Crown 1994). Dead trees according to the Standing position divided in two groups, Snags standing dead trees and Downed logs. a standing dead tree, known as a Snag is a miniature ecosystem bustling with the activities of thousands of living things. Tree mortality naturally occurs in forests, Dead trees make alive habitat and in addition Biodiversity in forest and help to settlement of regeneration (Harman & et. Al., 1986). A snag is a habitat for small creatures, insects, mammals, funguses, plants and other organisms (Kimel, 2001). Insectivorous Birds such as woodpeckers perfectly depend to the Snags for living habitat, These birds are apart of our natural ecosystem and help in controlling of pests. (McComb et al, 1983). The interior of hollow logs, or the space beneath a log, provide a stable and often moist micro-environment that is especially important to the survival of some species of amphibians and reptiles (Lowis, 1999). According to the Ammer studies in 1990, 40% of insects that live on the dead trees is useful for forest ecosystem, 8% of them is Amphoter, 41% is harmful and finally 5% of them only damage to the tree's wood and doesn't damage to the forest ecosystem. He refers that the amount of useful animals is more than harmful and the ecological balance exist between them (Ammer 1990). Managing of dead trees can help to improve biodiversity in forests, and we should keep them in future forest programs.

2. Materials and Methods

2.1. Study Area

This study was carried out in Beech mixed forest in Mazandaran province, chelir district in 36° N, 51° E, alt. 1200m, in an intact forest to study the effects of dead trees on Biodiversity in stand of Caspian forest of

Northern Iran. Stand include oriental Beech (*Fagus orientalis*), dominant species of stand, after it Hornbeam (*Carpinus betulus*), Alder (*Alnus subcordata*), Maple (*Acer sp*) and Oak (*Quercus castaneifolia*) respectively exist in stand.

2.2. Methods

At first, 50 hectares of forest area that was virgin, was chosen after this, 100 percent inventory from alive and dead tree's d.b.h (Diameter at breast height) was measured to estimate dead and alive stand volume. Dead trees divided in two groups, Snags (standing dead tree) and Downed logs and in 4 decay classes (according to the decaying intensity). In each dead trees, fauna and flora include animals, insects and plants that live on or in of dead debris, was recorded. funguses and more of organisms have an effective role in decaying of organic materials.

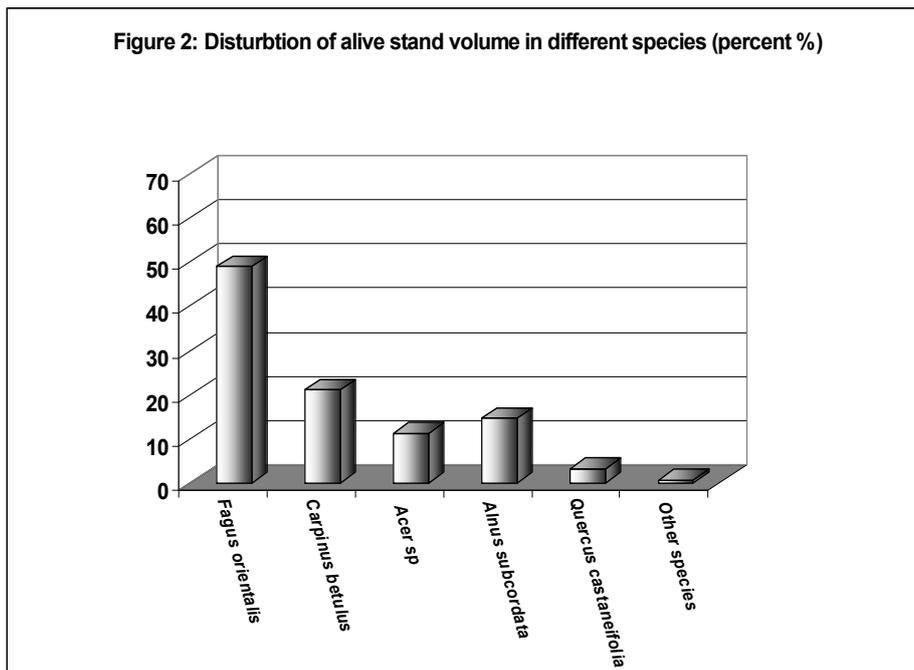


Fig. 2: distribution of alive stand volume in different species (percent%) .

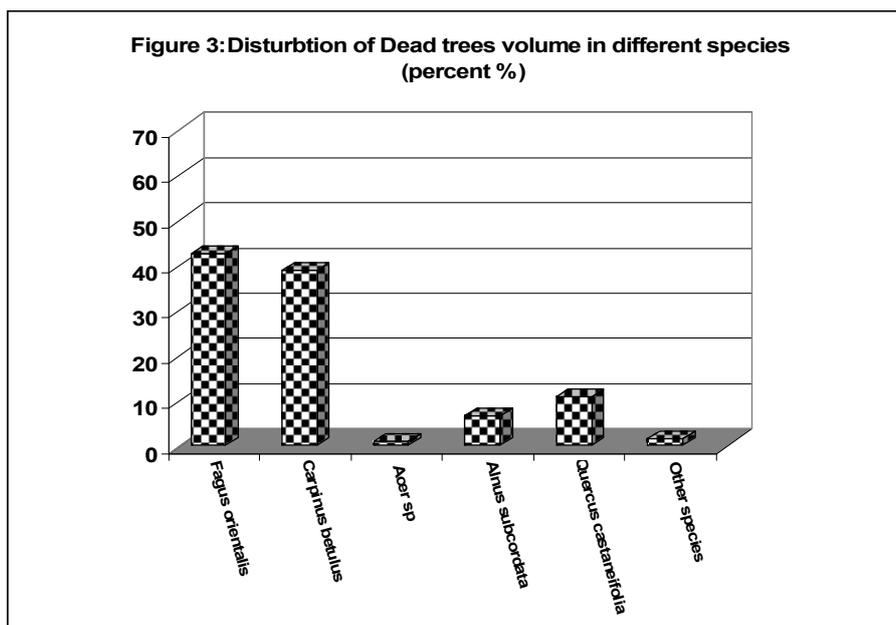


Fig. 3: Distribution of Dead trees volume in different species (percent %) .

3. Results

Research indicated that the stand volume is about 349 m³/ha and dead tree volume is about 16 m³/ha. Figure 2 and 3 shows the distribution of different species in volume percent for alive stand and dead trees respectively

Dead trees was divided in to Snags & Downed logs, research show that about 26% of dead trees volume was formed by Snags and 74% was Downed logs, high percent volume of Downed logs in compare with Snags show the existence of high decay procedure in forest ecosystem.

Ratio volume between dead trees to alive stand is about 5, it related that a normal position in ecosystem of forest between death and burn. The ratio of dead trees to the alive stand in species division that ready in Table 2, Comparing of these percents of alive and dead trees volume, shows that *Fagus orientalis* is in balance position in this stand, *Carpinus betulus* is decrease, *Ulmus carpinus* and *Quercus castaneifolia* are in extinction from this stand, but *Acer sp* and *Alnus sp* are increasing.

Table 2: Comparing between stand and dead trees volume in different species- in study area

Species	Alive stand m ³ /ha	Dead trees m ³ /ha	Volume ratio
<i>Fagus orientalis</i>	170.47	7.03	4.12
<i>Carpinus betulus</i>	73.6	5.13	6.97
<i>Alnus subcordata</i>	51.32	1.064	2.07
<i>Acer sp</i>	40.53	.141	.348
<i>Quercus castaneifolia</i>	11.14	3.021	27.11
Other species	2.16	.133	70.7
Total	349.22	16.52	5

Figure 4 shows the rate of activity in different species of insects, according to the figure 4, Cerambycidae one of insects family has a high activity on dead trees.

Funguses that live on the dead trees to consume and decaying them;

<i>Carrena unicolor</i>	<i>Calvana Formosa</i>
<i>Corriolus hyrcan</i>	<i>Corriolus pobescens</i>
<i>Corrilous versicol</i>	<i>Cyatus striatus</i>
<i>Donkia polkerrima</i>	<i>Drydon Corraloides</i>
<i>Exidia glandulosa</i>	<i>Fistuline hypatica</i>
<i>Fomes fomentaris</i>	<i>Ganoderma lucidum</i>
<i>Ganoderma adspensu</i>	<i>Ganoderma applanatum</i>
<i>Panus rudis</i>	<i>Inonotus Cuticularis</i>
<i>Herschiotopus howeianum</i>	<i>Herschiotopus abietinu</i>
<i>Lenzites betulina</i>	<i>Leptoporus adustus</i>
<i>Lycoperdon piriforme</i>	<i>Leptoporus dischorus</i>
<i>Oxyporus populinus</i>	<i>Tlarasminus rotula</i>
<i>Panus conchatus</i>	<i>Panus stipticus</i>
<i>Phellinus igniarus</i>	<i>Phellinus robustus</i>
<i>Polyporus arcularsi</i>	<i>Phylactria antocephala</i>
<i>Polyporus giganteus</i>	<i>Polyporus frondosus</i>
<i>Phycnoporus cinnabrinus</i>	<i>Trametes versicolor</i>
<i>Trametes trogii</i>	<i>Trametes hirsute</i>
<i>Phellinus igniarius</i>	<i>Trichaptum biforme</i>
<i>Pycnopouas cinnabarinus</i>	<i>Trometes hirsute</i>
<i>Armillaria mellea</i>	<i>Trametes versicolor</i>
<i>Ganoderma lucidum</i>	<i>Clavoria sp</i>
<i>Fomes fomentarius</i>	

Woodpeckers in the study were Lesser spotted woodpecker, *Dendrocops minor* (*Picoides minor*), this bird is small and it is native in Iran, Middle spotted wood pecker *Picoides medius*, with 12cm length and live in broadleaf forest especially in Oak, and live in cavity trees and dead trees, Black woodpecker *Dryocopus martius*, with 51cm length live in cavity trees and dead trees.(Mansouri, 2002). Results showed that different fauna and flora species lives on and in Snags and Downed logs and these diversity high dependence to dead trees decay classes. The ratio of dead and alive stand volume show that to improve the biodiversity in the study area increasing Snags volume in this forest is necessary. *Q.castaneifolia* and *F.orientalis* dead trees had high activity of insects and funguses respectively on their dead trees. this doesn't mean that Beech or Oak are the source of populations in forest ecosystem, So that there is a balance in forest between favorable and unfavorable organisms to the forest ecosystem.

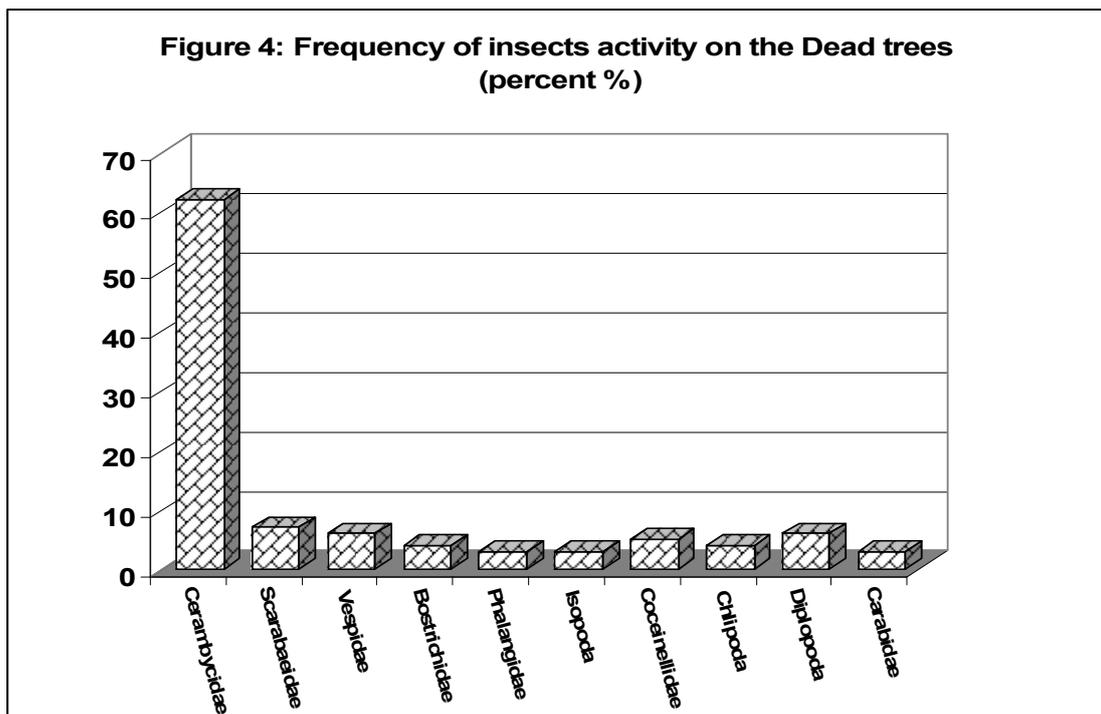


Fig. 4: Frequency of insects activity on the Dead trees (percent %)

4. Discussion

Just because a tree stops living doesn't mean it stops giving to environment around it. Dead trees has a effective role in addition to the Biodiversity of forest ecosystem, Forbes studies in 1997, show that 5%-10% of stand volume should be dead trees, this volume of them develop biodiversity in forest. Measures of studied area shows that about 5% of stand volume was dead trees, in this case for improve forest biodiversity we need increase it to 10%, this should prepare in management programs of study area, to have a rich biodiversity. Research of Habashi in 1998, in Mazandaran province forests indicated that the *Cerambycidae* was the highest population on the dead trees, several funguses in the forest that live on the dead trees, can be eaten by human, So that growth program for these funguses can be prepare in forest products to improve nutrition of a people, for example *Cortinellus edodes* in Japan named Mutsudake, is arisen on dead woods of forest for food. Management of dead trees is the important to improve natural regeneration, Biodiversity, and tourism economy. We should take it in our essential programs of forestry. Many more of animals benefit from dead trees in forest and there is a completely balance between them. Dead trees open gaps in crown of stand and reserve moisture and give nutrition materials to soil, so influence by have several effects to regeneration. Dead trees containing different and various species of organisms so that Disturbance frequency, intensity and pattern influence the availability of dead wood in forest stand (McComb et al, 1993). Managing of dead trees can help to improve biodiversity in forests, and we should keep them in future forest programs. (Waring & Wiliam, 1985).

5. References

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