Diversity of fungi is threatened not only in tropics but in temperate regions also. Especially for the country like India which is under immense population pressure and deforestation is likely to continue in nearby areas of forest. Fungi are indicators of forest health and play a crucial role in nutrient recycling by degradation of lignocelluloses, in regulating the tree diversity, function as ecological niches, provide shelter to small animals and food source for mites, animals as well as humans.

Diversity of wood decaying fungi has not been given much attention for the past three decades. Whatever the knowledge we have is the work of earlier researchers. We have not reassessed the areas previously studied. We do not know whether the reported fungi still exist or not. We have only managed to report only 7-8% of total estimated number of all forms of fungi (considering the fungi: plant ratio of 10.6:1 by O’Brien et al. 2005). The exact number of described wood decaying fungi is not known but number could be nearly 650-700 species. Many of them have been described many times and some species are treated as illegitimate. Considering the vast vascular tree diversity of 18,664 India has, the number could be between 900-1200.

In the present study, wood decaying fungi of Chakrata Hills has been studied under the topic, “Diversity and Distribution of Wood Decaying Fungi from Chakrata Hills of Dehradun Uttarakhand”. The reserve forest of Chakrata Forest Division is under Yamuna circle. The forest lie in the Chakrata sub division of Dehradun district in the watersheds of Tons, Yamuna and Pabar rivers. Total area of the division is 36,141 ha. Chakrata Forest division with great diversity of plant and high annual precipitation provides fairs chances for fungi to fruit. This area had not been studied for the past 40 years. Fungal diversity of this area has been well described. The objective of the study was to assess diversity and prepare database. Later sites were compared using ‘effective number of species’ based on Shanon index to whether there is any effect of human disturbance on net gain or loss of species from sites in subsequent years.

Methodology: Sampling of wood decaying fungi was done at 8 sites namely: Kalsi, Sahiya, Korua, Chakrata, Deovan, Lokhandi, Budher and Kanasar. Line transect method was followed in sampling. Transect were laid along the line. Multiple sampling was performed to ensure more number of fungi. As annual variation exist in fruiting of some fungi.
Most of the fungi were identified in field specimens of which identification was difficult were brought to Forest Pathology Division for microscopic study. Given names of the fungi are in accordance with Mycobank and Index fungorum.

Statistical analysis used: rarefaction curve and different estimators were calculated with EstimateS 9.1.0 with 100 randomizations. Estimators used for estimating the species richness were Chao1, Chao2, Jacknife1, Jacknife2 and Bootstrap. Percent frequency of individual species were calculated, similarity index using Sorenson and Jaccard index were calculated to compare the similarity between two sites as data present on various sites is ‘multivariate’ and only looking at the data will be difficult to tell how similar are sites to each other. Two dimensional plots were made for easy interpretation of similar sites with the help of data obtained from Sorenson similarity coefficient, Tischler's scale (1949) parameters, diversity statistics parameters such as Shanon, Simpson and McIntosh diversity indexes were calculated for each study site with their evenness. Rank abundance was constructed using species abundance data.

**Results**: 4 year survey data was pooled. 164 wood inhabiting fungi (polyporoid and corticioid) from 61 sampling units of 2220 records were found. The mean number of fungi recorded per year is 96.75 and s.d. ±22.9256 (this is because the less area was sampled in first year and most of resupinate forms were excluded, though the mean number for the rest three years was observed to be 107 and s.d. ±10). The number of singletons was found to be 45, number of doubletons was 41. The high number of singleton and doubleton can be indicative of incomplete sampling or Forests are under pressure or more number of rare species are present in the community. However, error cannot be ruled out but up to four year, intensive sampling has been done in this area and estimators also showed adequate sampling has been done. We can clearly relate it with the pressure on the forests as irregular felling and lopping is quite common in this area and forest were being converting from type II to Type III with increasing human population and animal population day by day. As in the present study some of the recorded species could not be recorded in subsequent years because hosts were removed. Though, in nature most species are rare species but chances cannot be ruled out that more disturbed area give less chances to fungi to propagate.

In the present study the species accumulation curve did not reach the ‘asymptote’ or did not reach the saturation level. Depending on the estimator, this number represents about 71–87% of the predicted richness which shows adequate sampling has been done. Estimated number of species by different estimators as follows: (Chao1 = 188.68
The family with largest genera and species was found to be *Polyporaceae* (22 genera, 48 species) followed by *Hymenocheataceae* (5 genera, 44 species) and *Meruliaceae* (7 genera, 10 species). The most dominant genera based on species richness was found to be *Phellinus* (22) followed by *Trametes* (11), *Daedalea* (10) and *Inonotus* (8). The most dominant genera based on frequency was *Stereum* (190.16%, sum frequency of all species), next most frequent genera in order were *Trichaptum* (139.344%), *Trametes* (124.59%), *Phellinus* (103.27%) and *Gloeophyllum* (81.96%).

The most frequent species in order were *Trichaptum biforme* (73.77%), *Trametes versicolor* (73.77%), *Trichaptum abietinum* (65.57%), *Stereum hirsutum* (55.73%), *Heterobasidion annosum* (52.45%). The most abundant fungal species were *Trichaptum biforme* (9.32%, present in 45 sampling units), *Trametes versicolor* (9.27%, present in 45 sampling units), *Trichaptum abietinum* (6.75%, present in 40 sampling units), *Stereum hirsutum* (3.33%, present in 8 sampling unit), *Fomes fomentarius* (present in 30 sampling units), *Heterobasidion annosum* (present in 32 sampling units) and *Gloeophyllum sepiarium* while *Stereum sanguinolentum* (9.09%), *Stereum hirsutum* (7.52%, present in 34 sampling units), *Stereum gausapatum* (5.94%, present in 44 sampling units), *Stereum ostrea* (2.34%) were most abundant corticioid forms. Species were not fairly equally distributed this can understand by the given fact in which 13 species made a total abundance of 66.22% and rest 33.78% species accounted rest of 151 species. The slope of the species rank vs. log abundance curve also confirm the same which is steep at the start and then levels out, showing that abundance is less evenly distributed among the most common species than it is among the uncommon and rare fungi. The Shannon Weaver equitability index was 3.7319, and the Berger-Parker dominance index was 0.0932, both of which indicate high richness of species and less equal distribution.

From 2011 to 2014, a total of 164 species of wood decaying fungi were observed, representing 62 genera and two fungal guilds. 65 species from 36 genera were found in 2011, 95 species from 44 genera were found in 2012, 112 species from 48 genera and 115 species from 55 genera were found in 2014. In the first sampling occasion nearly 40% of the total recorded fungi were observed it was only 32% of the total estimated richness (Chao2) and in second sapling occasion this increased to more than 65% of total observed fungi.
The sum frequency of all species and species groups in the end was 1478.689 % in total sampled area of 45500 m², so average 1000 m² transect had almost 10 different fungal species fruit on it during the course of a year.

Sampling area was increased in subsequent years to see whether there is any increase in species number and minimum area required for representable number of species. It was observed that minimum three sampling occasions are required to get at least representable number of species. On increasing the area, species richness also increased simultaneously. In 2011, 28,000 m² area was surveyed, 65 species of 37 genera with 375 sporocarps were recorded. It accounted only 39.63% of the total observed and 32.73% of estimated richness. In 2012, 34,500 m² area was surveyed and observed species were 95 belonging to 42 genera with 507 sporocarps. In 2012, 41 new species were in the list, making species richness to 106. It was 53.38% of the estimated richness.

In 2013, surveyed area was 44,000 m², 111 species belonging to 48 genera with 608 sporocarps and 38 new species were added in the list making a total of 144 species. It was 72.52% of the total estimated richness. Species composition did not vary much in 2014 where the number of observed species were 115 belonging to 55 genera with 721 sporocarps in an area of 45,500 m² and added another 20 species, making total of 164 species which was 82.60% of the estimated richness. From the above observation we can conclude that multiple surveys are needed to get a representable number of species richness from a region or habitat. From the present study, it was estimated that minimum of four sampling year are needed to get at least 80% of the estimated species richness. It was evident that on increasing the area, number of species was also increased i.e. increase in sampling area and number of species were positively correlated.

Distribution of fungi was studied at different altitudinal level. As expected lower regions were found to be most rich due diversity in vegetation. Lower regions shared very less similarity with temperate regions. Alt2 and Alt3 shared Ss=0.47. At Alt1 very few species were found to be dominant. As the altitude increases species first increases then decreases and again increases in a unit area, N/S ratio also increases. At higher altitude species accumulated more slowly that lower altitude due to high production sporocarps by some species. Some species were host specific and confined to one locality only, while some showed broader range.

Similarities among areas was calculated differently for different years. Total species composition varied from year to year but overall richness remained somewhat similar as observed with similarity index. Among the sites KL+SH shared very less
species with others because of different vegetation and environmental conditions. Maximum similarity among sites was found to be between CH+KR & KN with Ss= 0.55. Nearby sites were combined, the idea behind this was combining will give a higher species richness in particular. Rest of the other sites are temperate but geographically different and have similarity only 18-38%. These similarity values have been best represented in two dimension plots. Species diversity of sites for different year was compared using effective number of species. KL+SH, CH+KR observed increase in species richness, DV and LK+BD observed no change in species diversity at the end of fourth sampling occasion while Kanasar observed decrease in net species richness. Kanasar is adjacent to villages where irregular cutting is quite common for fuel, fodder and timber. Kanasar observed most drastic decrease from 70.58% of total observed in 2012 to 56.86% in 2014. The anthropogenic activities are quite prevalent in these areas. However, we are not sure whether it is a true absence or an annual variation but this is true only for annual species only but some of the perennial forms were found missing in subsequent years as host were removed and did not recorded elsewhere.

For such disturbed areas checklist is very important as only then we will be able to design conservation strategies. Checklist provides baseline information for a particular habitat or geographical area. Such list provides the presence absence data of 5-20 years that determine the status of fungi in a particular habitat or geographical area which is helpful in determining the RED list of species for a that habitat. An attempt has been done to give threatened list for the study area, as present data is very small and does not fall into IUCN criteria yet it can play its role in conservation. Fungi were assessed indirectly and categorized in NT, LC, DD, NE. In the present list 35 fungi has been included into NT category. On comparing the previous data 52 the species were found missing but 88 new species were added to the list.

Fungi are obligatorily dependent on plant, saving later can result in saving earlier. For conservation of wood decaying fungi, dead wood should not be removed from the forest but practicality of this, is questionable as locals have been traditionally getting fuel wood, timber wood from forest. Denying them to do so can only result in dissatisfaction. This can be seen in Chakrata cantonment region where collection is completely ban due to security reason. Collection of dead wood is actually allowed under Forest Recognition Act (2006). Habitat destruction is quite on note in this region.