I. INTRODUCTION

1.1 Background

In the past earth's land area are covered by 12 percent of tropical forests, but now not even five percent of it can fill it. Because of the high density and diversity tropical forests provide various ecosystem services. Compared to other forests, it full of species and biomass (Brandon, 2014). In a forest, a tree is a dominating component which acts as a producer organism and habitat for various types of birds and other animals. In the process of photosynthesis trees use solar radiation energy, so they can assimilate CO_2 and H_2O to produce chemical energy stored in carbohydrates and release oxygen. Tree diversity can be used as an indicator of the community level based on its biological organization (Indriyanto, 2006). Despite the many people known the benefits of forests and consequences of their loss for decades, recent findings show that it have substantially underestimated both their global importance and the impacts of their loss (Brandon, 2014).

Tropical forest degradation can significantly reduce or eliminate the flow of ecosystem services. Degraded and fragmented forests, secondary forests, and plantation forests all have a lower variety and quality of ecosystem goods and services flowing from them compared to intact, healthy forests. Tropical deforestation and degradation reduce or halt the flows of ecosystem goods and services, while increasing the vulnerability of billions of people to damaging impacts (Brandon, 2014). Biodiversity loss from deforestation may be partly offset by the expansion of secondary forests and plantation forestry in the tropics (Barlow *et al.*, 2007).

Secondary forests now constitute large areas in many countries (Brown and Lugo 1990) and are becoming an increasing component of forest cover in many tropical countries as regrowth following deforestation (De Jong *et al*., 2001). The term secondary forest then relates to the successional forests that develop after clearing of the original forest (Clements, 1916). Forests can be managed effectively if reliable information about current and future forest conditions is available. This information can be a model of growth and yield from the forest (Porte and Bartelink, 2002). Modeling the radial growth of each tree (diameter or basal area growth) is often the starting point. Growth is an important aspect to describe the condition of tree dynamics in tropical forest conditions (Bollandsås and næsset, 2009).

The equation for growth of tree diameters or basic broad-field growth equations has traditionally been used as one of the main types of growth equations for individual tree growth models (Dolph, 1988). Along with high growth, diameter growth is needed to calculate the volume growth and product potential of each tree, and is used with high growth and mortality equations to calculate base area growth and stand volume growth (Hann and Larsen, 1991).

On this research the relative diameter growth rate will be conducted on the Biological Education and Research Forest of Andalas University, Padang, West Sumatera. There are several studies being conducted in Biological Education and Research Forest of Andalas University. One of them is a research that was carried out in 2005 about Diameter Growth Rate of Several Pioneer Species Trees at Limau Manis Secondary Forest. Another research is about Tree Composition and Structure at Limau Manis Secondary Forest Areas that was conducted in 2004 and there is still many others

research about plant ecology that was carried out at Biological Education and Research Forest of Andalas University.

Based on the description above, it was found that it was necessary to conduct research on Relative Diameter Growth Rate of Several Important Trees Species in Permanent Plot of Biological Education and Research Forest Andalas University. Publications about the permanent plot area of the Biological Education and Research Forest of Andalas University are still lacking and limited. This research needs to be carried out as an introduction to the permanent plots of the Biological Education and Research Forest of Andalas University. The research is expected to be used as a source of information and can be taken into consideration in efforts to manage, develop and protect plant species in the area of the Biological Education and Research Forest permanent plot of Andalas University.

1.2 Formulation of the Problem

Based on the background detail above, the formulation of the problem in this research is to know the Relative Diameter Growth Rate of Several Important Trees Species in a Permanent Plot of Biological Education and Research Forest Andalas University.

1.3. Purpose of the Research

1. To clarify the Relative Diameter Growth Rate of Several Important Trees Species in a Permanent Plot from 2004 until 2019.

2. Species characteristic of Relative Diameter Growth Rate from 2004 until 2019.

1.4 Significance of the Research

The result of this research is expected to be useful as information in the field of plant ecology study and can be used as reference for parties related to the rehabilitation of damaged forests.