INTRODUCTION

Background

Avocado (*Persea americana* Mill) is an evergreen tree native to Mesoamerica. Cultivars of Guatemalan, Mexican, and West Indian origin have spread, becoming important crops in many tropical and subtropical regions around the world, such as Florida, California, Australia, South Africa, Spain and Israel. The avocado was introduced to Indonesia in 1750 (Morton, 1987). Avocado germplasm plant in Research and Technology Assessment, Tlekung, Malang was long red avocado, red round, dickson, butler, winslowson, benik, Puebla, fuerte, collinson, waldin, ganter, duke, ryan, leucadia, queen and edranol (DEPTAN, 2010).

Open pollination reproduction mode and mutations proposed as the main source of the genetic diversity in Indonesian avocado. Differences in climate and soil conditions in Indonesia by center of origin also makes the avocado has a high diversity. Diversity can be seen in plant morphology of avocado. Based on Bai *et al.* (2000), in the germplasm collection, characterization of individual accessions and cultivars is very important to elucidate the genetic material of plants that will be used as parental crosses in breeding. Therefore, it is necessary observations and characterizations various types of avocados in Indonesia.

Study for the observation and characterization of avocado could be done based on morphological characters and molecular markers. Evaluation of avocado characterization is usually based on morphological descriptions of plants observed from the beginning of planting until the plants mature and fruit set. However, this method requires time because the avocado plant is an annual plant. In addition morphological traits are highly influenced by the environment (Shahsavar *et al.*, 2007). Therefore, other ways to characterize the avocado is needed.

Molecular marker is a marker that based on biochemical reactions and molecular structure of genes in a species. Molecular markers more accurately and faster than the characterization of the morphology because it involves genes as objects and not have to wait until the plants mature. One molecular marker that can be used is microsatellite markers using Inter-Simple Sequence Repeat (ISSR).
ISSR amplification is one of molecular marking technique that is useful in genetic fingerprinting to analyze genetic and to identify as well as classify germplasm. According to Zietkiewicz et al. (1994), ISSR markers are molecular typing approaches that have been used to detect variation among plants. This method has been used extensively to identify and determine relationships at the species and cultivar levels. ISSR method widely applicable because it is rapid, simple to perform, does not require prior knowledge of DNA sequence and requires very little starting DNA template. Pradeep Red et al. (2002) said that ISSR technique combines most of the benefits of AFLP and SSR markers with the universality of RAPD.

Avocado characterization that often accomplished was based on morphological description and molecular markers. In Indonesia, studies about avocado identification using morphological trait have been done in Sukabumi (Arham, 2006), Garut (Susanto, 2006), and Bogor (Fazri, 2008). However, genetic variation analysis of avocado using DNA based on molecular markers of Indonesia avocado germplasm have not been done yet.

**Objective**

The objective of this research was to elucidate the genetic diversity among 23 accessions of avocado based on their morphological characters and ISSR analysis.