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LETTER TO THE EDITOR

Growth Characteristics of *Fraxinus velutina* Under Different Site Conditions

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Stem-analysis and timber segregation observation were conducted to investigate the effects of different site conditions on the height, ground diameter, volume and fiber morphology of *Fraxinus velutina*. The results showed that the growth characteristics were significant difference on the different site conditions. *Fraxinus velutina* grew better on the site of sufficient water and fertilizer and good soil texture. The growth characteristics were medium，but it was suitable for furniture and fiberboard processing industry.

I Introduction

Fraxinus velutina (Chinese ash wood) belongs to genus of *Fraxinus* in *oleaceae* family, deciduous broadleaf shrub or small tree, up to 15 meters high, mainly distributed in southwestern, Central, Eastern and Northern China (Cecilia Valles-Aragon et al. 2017, Lilly R, et al. 2018, Yu et al. 2019). Meanwhile it is one of the economic tree species in China and has strong salinity adaptability (Li et al. 2010, Du et al. 2104, Xiao et al. 2016, Li et al. 2016, Eugenio et al. 2016, Bai et al. 2018). At first, *Fraxinus velutina* was used for wind break and sand fixation in Henan Province of China, which was dwarf cultivation in the farmland shelter forest network in the district of Shang-qiu and Kai-feng (Fan, et al. 2000, Qiang et al. 2008, Bai, et al. 2108, Feng et al. 2018).

Fraxinus velutina was versatile hardwood for the furniture and sporting goods, which was the precious commercial forest (HeliñskaRaczkowska et al. 1999, Straže et al. 2001, Majanomajano et al. 2012, Rong 2014, Brulé et al. 2016, Wehsener et al. 2017). The site conditions have significant influence on the growth Characteristics of *Fraxinus velutina* (Kerr et al. 2004, Yang et al. 2012, Tanis et al. 2015). Meanwhile the phytochemical constituents of *Fraxinus velutina* has been investigated for medicine and food industry (Shammas et al. 1990, Mei et al. 2003, Kostova et al. 2007, Ma et al. 2008, Yang et al. 2009, Wu et al. 2014, Si et al. 2015, Si et al. 2016, Peng et al. 2017). Some studies about anatomical, chemical and mechanical properties of *Fraxinus* have been studied (Laine et al. 2013, Wu et al. 2009, Tudor et al. 2017, Majka et al. 2018).

In order to make comprehensive use of *Fraxinus velutina*, the wood features and growth characteristics of *Fraxinus velutina* under different site conditions would be investigated in this paper. (Kocaefe et al. 2008, Yan et al. 2009, Li et al. 2014, Kaiyue et al. 2017, Du et al. 2018).

II Materials and Methods

Materials: Samples were collected from shang-qiu prefecture in Henan on the typical plots with 50 m*4 m: A):

cultivated land of sand, loam and clay, water and fertilizer were enough; B): cultivated land of arenaceous soil, clay layer in soil profile.

Methods: The disk positions were 0, 0.35, 1.05, 1.75, 2.45, 3.15 m and so on according to the height and ground diameter. Then growth characteristics were calculated and the correlative curves were draw. Fiber morphology: Anatomical indexes were measured by using professional software in the computer. The average value of 30 fibers was taken for each sample.

III Results

The Current Annual Increment (CAI) of height, ground diameter and volume: In general, the CAI of height, ground diameter and volume of A were higher than that of B except for one year (Fig. 1). The growth characteristics were influenced by the soil texture and fertilizer water.

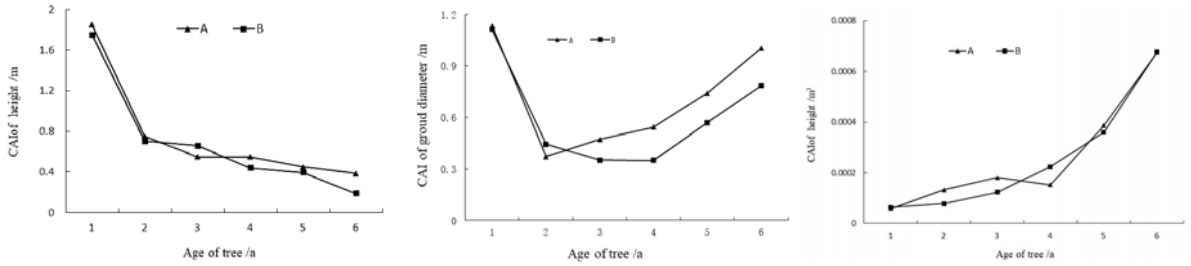

Fig. 1 CAI of height, ground diameter and volume

Fiber length, width and wall thickness: As the Fig. 2 showed, the fiber length, width f A were bigger than that of B along radial and axial direction. But the wall thickness of A was smaller than B along annual ring and height in the late.

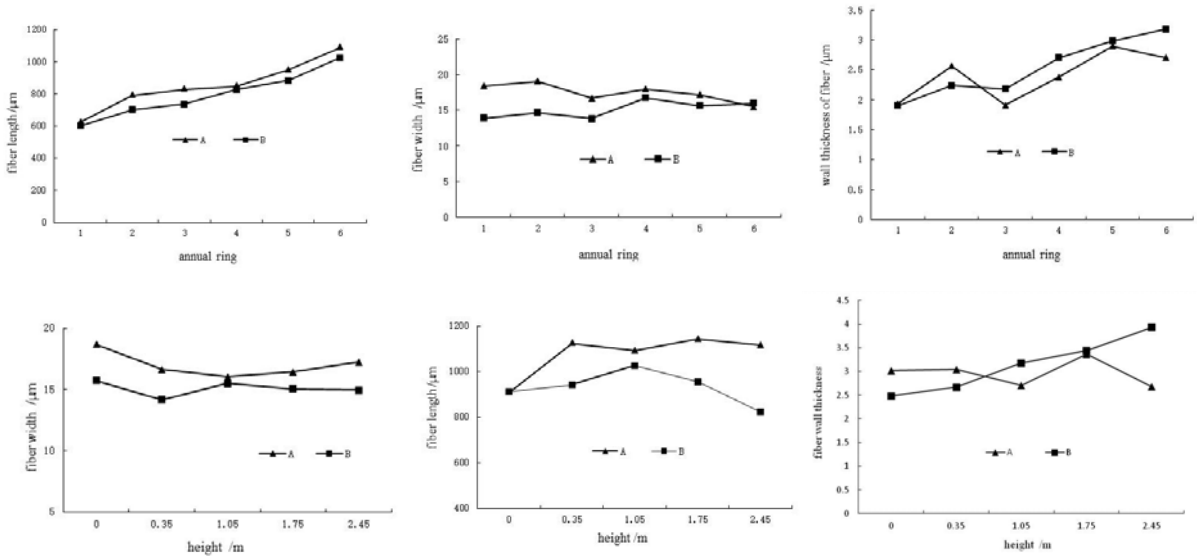

Fig. 2 Radial and axial variation of fiber length width and wall thickness

Length width ratio and wall thickness-diameter ratio of fiber: The length width ratio of A was bigger than that of B along radial and axial direction (Fig. 3). But the wall thickness-diameter ratio on both sites were opposite. The results showed that the fiber of A was useful for paper making and wood processing.

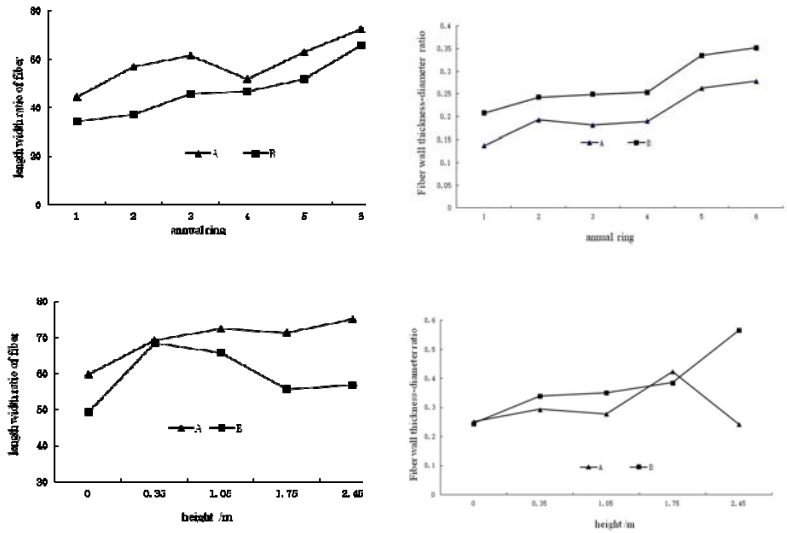

Fig. 3 Radial and axial variation of length width ratio and wall thickness-diameter ratio

IV Conclusions

There were significant differences of growth characteristics. The better site conditions could obviously promote the growth and improve wood properties. The results showed that growth characteristics of A were suitable for furniture and fiberboard production industry.

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