

不同种源水曲柳半同胞家系间种子形态变异与休眠差异研究

刘婷, 董博文, 张鹏*

(东北林业大学林学院, 森林生态系统可持续经营教育部重点实验室, 哈尔滨 150040)

摘 要:【目的】为探究不同种源和半同胞家系水曲柳种子形态变异与初生休眠的差异, 为水曲柳良种选育和良种壮苗提供科学依据。【方法】本研究选择源自 3 个种源的 6 个半同胞家系种子(分别记为 1#~6#), 共 18 个半同胞家系水曲柳种子为研究材料, 测定果实千粒重、果长、种长、胚长、胚率和胚重比等形态指标, 分析种子经过不同的裸层积时间(暖温 10 周+低温 8 周、暖温 10 周+低温 10 周、暖温 10 周+低温 12 周、暖温 12 周+低温 8 周、暖温 12 周+低温 10 周)后在 10℃下的萌发表现。【结果】种源和半同胞家系的交互作用对种子形态指标和发芽率影响显著 ($P<0.05$)。种子胚重比的变异系数变化范围为 2.03%~21.73%, 果长变异系数变化范围为 0.81%~4.54%; 其中带岭 3#果实千粒重最重 (73.89 g), 白石山 2#种子胚重比最大 (8.5%), 带岭 2#种子胚率最大 (75.05 %), 白石山 5#种长最长 (32.76 mm)。白石山 1#种子与 2#种子的萌发表现较好, 白石山 1#种子经过暖温 10 周+低温 8 周层积处理后发芽率较高 (73%), 暖温 10 周+低温 12 周层积处理后发芽率达到 91.25%。临江 6#种子经过较短时间(暖温 10 周+低温 8 周)的层积处理后发芽率达到 70%以上。【结论】不同种源不同半同胞家系水曲柳种子的形态变异和休眠差异明显, 筛选出解除初生休眠时间较短的优良半同胞家系为白石山 1#水曲柳种子。

关键词: 水曲柳; 半同胞家系; 形态特征; 解除休眠; 种子萌发

Seed Morphological Variation and Dormancy Differences Among Half-sibling Families of *Fraxinus mandshurica* from Different Provenances

Liu Ting, Dong Bowen, Zhang Peng *

(Key Laboratory of Sustainable Forest Ecosystem Management Ministry of Education, School of Forestry, Northeast Forestry University, Harbin 150040, China)

Abstract :【Objective】 To explore the differences of seed morphological variation and primary dormancy in different provenance and half-sib family, and to provide scientific basis for the breeding and seedling strengthening of improved varieties of *Fraxinus mandshurica*. 【Methods】 In this study, 6 half-sib seeds (1#~6#, respectively) from 3 seed sources were selected as research materials, and a total of 18 half-sib seeds of *F. mandshurica* were measured, including fruit 1000-grain weight, fruit length, seed length, embryo length, embryo rate and embryo weight ratio. The germination performance of seeds at 10℃ after different bare stratification times (warm temperature 10 weeks + low temperature 8 weeks, warm temperature 10 weeks + low temperature 10 weeks,

warm temperature 10 weeks + low temperature 12 weeks, warm temperature 12 weeks + low temperature 8 weeks, warm temperature 12 weeks + low temperature 10 weeks) was analyzed. 【Results】 The interaction between provenance and half-sib family had significant effects on seed morphological indexes and germination percentage ($P<0.05$). The variation coefficient of seed embryo weight ratio ranged from 2.03% to 21.73%, and the variation coefficient of fruit length ranged from 0.81% to 4.54%. The fruit 1000-grain weight of Dailing 3# was the highest (73.89g), the seed embryo weight ratio of Baishishan 2# was the highest (8.5%), the seed embryo rate of Dailing 2# was the highest (75.05%), and the seed length of Baishishan 5# was the longest (32.76mm). Baishishan 1# seed and 2# seed germination performance was better, Baishishan 1# seed germination percentage was higher (73%) after 10 weeks of warm temperature + 8 weeks of low temperature stratification treatment, and the germination percentage reached 91.25% after 10 weeks of warm temperature + 12 weeks of low temperature stratification treatment. The germination percentage of Linjiang 6# seed reached more than 70% after a short time (10 weeks of warm temperature + 8 weeks of low temperature). 【Conclusion】 The morphological variation and dormancy of *F. mandshurica* seeds in different half-sib families with different seed sources were significantly different. Baishishan 1# *F. mandshurica* seed was selected as an excellent half-sib family with short dormancy release time.

Key words: *Fraxinus mandshurica*; Half-sib families; Morphological characteristic; Release dormancy; Seed germination