

Abstract

The objectives of this study were to research and develop inbred lines of hemp. There were 3 experiments consist of; (1) production and evaluation of S₄ lines (2) verification DNA marker for determination for hemp breeding program (3) study relationship between DNA markers percent fiber in hemp.

For Experiment 1, 200 S₃ lines were grown, sib mating and 339 S₄ lines were harvested. The S₃ generation showed large range of segregation in all agronomic characters. Large phenotypic diversities were found, both within and between lines. Significant positive correlation coefficients were found between all agronomic characters except fiber content. One hundred and fifty S₄ lines were selected. Seeds collected from S₃ generation were sown. The S₄ generation also confirmed the large range of segregation with high phenotypic diversities, both within and between lines in all agronomic characters. Most lines had THC below the 0.3% threshold and CBD:THC higher than 2. Superior lines will be selected. The remnant of selected S₄ seeds will be sown next season to develop S₅ generation and crossed to tester.

For Experiment 2, 144 plants were recorded for sex and leaf DNA analysed with P5_1 marker. Data were compared and percentage of accuracy calculated. DNA determination of sex and visual observation agreed at 80.5%. Over estimation of male and under estimation of female plants by DNA analysis was found. In addition, 7 plants were identified as heterozygous genotype.

For experiment 3, leaf samples of S₄ population were collected. Bulk DNA samples were made for high percent fiber and low percent fiber. Two microsatellite markers (Cs303 and Cs304) were used to determine the DNA pattern among the DNA bulks. Significant relationship between molecular marker Cs304 and fiber content was found. High and low fiber percentage could be differentiated at 200 bp. At this location, fiber percentage of plants identified as homozygous (-) were significantly higher than those of homozygous (+) genotypes. Therefore, it is possible to use this marker to assist in breeding for high fiber percentage in hemp.