

Thitivara Sengloung 2009: Phenological Characteristics and Fiber Properties of Thai Hemp (*Cannabis sativa* L.). Doctor of Philosophy (Botany), Major Field: Botany, Department of Botany. Thesis Advisor: Associate Professor Lily Kaveeta, Ph.D. 130 pages.

Hemp (*Cannabis sativa* L.) was cultivated under the Royal Initiative Project by Queen Sirikit Botanic Garden in 2002 to 2004. The phenological development of Thai hemp showed the stable flowering time over three years recorded. Thai hemp was dioecious, determined at photoperiodism between 11 to 12 hrs under natural climate in Chiang Mai province. Hemp root was diarch at primary stage and develop as ordinary dicotyledons at mature. The glandular and non-glandular trichomes appeared on leaf surface and female bract. There were 3 types of fiber in hemp stem, core fiber (20.23 μm width, 0.62 mm length) was in woody part, primary bast fiber (25 μm width) was irregular shape and secondary bast fiber (16 μm width, 3.4 mm length) was small and round shape.

The planting date had an affect to plant growth and development of Thai hemp. In 2004, hemp was grown in 4 sowing date which found that late planting dates have affect to reduce maximum stem length and diameter. The floral development and time for changing from vegetative to reproductive phase was faster. Male plant was higher in final stem length and the ratio of male: female plant was 57.68 : 42.32. The phyllotaxy of Thai hemp was changed from opposite decussate to spiral at 5.86 to 6.33 leaves pairs.

Fiber properties of Thai hemp which grown at density 20 to 30 plant.m² performed a good quality for modern spinning process. Fiber fineness was 14.5 to 26.6 FBAI₂₀₀ or 14.08 to 18.86 μm . Fiber collective strength was 10.9 to 27.4 cN.tex⁻¹ and single bundle was 35.00 to 72.38 cN.tex⁻¹. Fiber bundle length between 22.0 to 28.4 mm, lignin content was 10.0 to 20.0 by Kappa number. Hemp yield the fiber content at 9.87 to 12.84%. The portion of defoliated stem was a wood 75.29 to 78.31% and bast 21.69 to 24.71%. Fiber maturity was reached at flowering time as the suitable time for harvesting. Testing methods, age of plant and various part of stem have an effect on fiber properties. The successful improvement should optimize the fiber quality and yield for specific utilization of hemp fiber.

Student's signature

Thesis Advisor's signature

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