

## RINGKASAN

*Hypnum cupressiforme* var. *filiforme* merupakan jenis lumut daun dari famili Hypnaceae yang tumbuh di substrat yang lembab dengan filoid berwarna hijau kekuningan, berukuran kecil, berbentuk lanset dan ujung meruncing. Kondisi lingkungan dapat mempengaruhi adaptasi pada lumut secara struktural melalui perubahan struktur morfologi dan secara fisiologis dengan memproduksi metabolit sekunder seperti flavonoid. Tujuan dari penelitian ini yaitu untuk mengetahui pengaruh ketinggian tempat terhadap karakteristik mikromorfologi dan kandungan flavonoid *H. cupressiforme* var. *filiforme* serta menentukan kandungan flavonoid tertinggi dalam *H. cupressiforme* var. *filiforme* pada berbagai ketinggian tempat di Kebun Raya Baturraden.

Penelitian ini dilakukan menggunakan metode survei eksploratif dan teknik pengambilan sampel *purposive sampling* di Kebun Raya Baturraden pada range ketinggian 600-900 mdpl dari bulan November 2024 - April 2025. Penelitian ini dilakukan di Laboratorium Struktur dan Perkembangan Tumbuhan dan Laboratorium Fisiologi Tumbuhan. Variabel yang dianalisis pada penelitian ini meliputi ketinggian tempat tumbuh *H. cupressiforme* var. *filiforme* sebagai variabel bebas, sedangkan karakter mikromorfologi dan kandungan flavonoid pada *H. cupressiforme* var. *filiforme* sebagai variabel terikat. Parameter yang diamati dalam penelitian ini berupa mikromorfologi gametofit dan sporofit, serta kandungan flavonoid dari ekstrak *H. cupressiforme* var. *filiforme*. Data karakter mikromorfologi *H. cupressiforme* var. *filiforme* dan uji kualitatif flavonoid dianalisis secara deskriptif, sedangkan uji kuantitatif flavonoid pada *H. cupressiforme* var. *filiforme* dianalisis menggunakan *Analysis of Variance* (ANOVA) pada taraf kesalahan 5% dan 1%. Hasil uji ANOVA yang diperoleh berbeda sangat nyata, kemudian analisis dilanjutkan dengan uji *Duncan's Multiple Range Test* (DMRT).

Berdasarkan hasil penelitian, ketinggian tempat yang lebih tinggi menghasilkan filoid dan spora yang lebih besar, serta peningkatan produksi flavonoid pada *H. cupressiforme* var. *filiforme* di Kebun Raya Baturraden. *H. cupressiforme* var. *filiforme* memiliki mikromorfologi gametofit berupa *life form smooth mats*; rhizoid di bawah cauloid; filoid hijau kekuningan (#707428), panjang 1,3-1,5 mm, lebar 0,4-0,5 mm, lanset, ujung meruncing, pangkal rata, dan tepi bergerigi; filoid tersusun spiral pada cauloid; tidak terdapat costa; sel filoid linear dan tidak terdapat sel alar maupun sel hialin. Mikromorfologi sporofit *pleurocarpous*; seta tegak, berwarna merah, panjang 18-20 mm; kapsul dewasa berwarna cokelat; serta unit spora monad, berbentuk *subspheroidal*, panjang 0,012-0,016 mm, lebar 0,012-0,015 mm. Kandungan flavonoid menunjukkan reaksi positif pada reagen NaOH 10% dibuktikan dengan perubahan warna ekstrak menjadi cokelat. Hasil ANOVA dan uji lanjut DMRT menunjukkan ketinggian tempat berpengaruh pada peningkatan kandungan flavonoid ekstrak *H. cupressiforme* var. *filiforme*. Kandungan flavonoid tertinggi sebesar 60,51 mg QE/g pada ketinggian 801-900 mdpl di Kebun Raya Baturraden.

**Kata kunci:** Baturraden, flavonoid, *Hypnum cupressiforme* var. *filiforme*, ketinggian tempat, mikromorfologi

## SUMMARY

*Hypnum cupressiforme* var. *filiforme* is a species of moss from the family Hypnaceae that grows on moist substrates, characterized by yellowish-green phyllids that are small, lanceolate, and acuminate. Environmental conditions can influence moss adaptation structurally, through changes in morphological structures, and physiologically, by producing secondary metabolites such as flavonoids. This study aimed to investigate the effect of altitude on the micromorphological characteristics and flavonoid content of *H. cupressiforme* var. *filiforme*, as well as to determine the highest flavonoid content of *H. cupressiforme* var. *filiforme* at various altitudes in Baturraden Botanical Garden.

The research was conducted using an exploratory survey method with purposive sampling at altitudes ranging from 600 to 900 m a.s.l. in Baturraden Botanical Garden from November 2024 to April 2025. The study was carried out in the Plant Structure and Development Laboratory and the Plant Physiology Laboratory. The independent variable was the altitude at which *H. cupressiforme* var. *filiforme* grew, while the dependent variables were micromorphological characteristics and flavonoid content. Parameters observed included the micromorphology of the gametophyte and sporophyte, and the flavonoid content of *H. cupressiforme* var. *filiforme* extracts. Micromorphological characteristics and qualitative flavonoid tests were analyzed descriptively, while quantitative flavonoid analysis was performed using Analysis of Variance (ANOVA) at 5% and 1% significance levels. Significant ANOVA results were followed by Duncan's Multiple Range Test (DMRT).

The results showed that higher altitudes produced larger phyllids and spores, as well as increased flavonoid production in *H. cupressiforme* var. *filiforme* in Baturraden Botanical Garden. The gametophyte micromorphology of *H. cupressiforme* var. *filiforme* was characterized by a smooth mat life form; rhizoids located beneath the cauloid; yellowish-green phyllids (#707428), 1.3–1.5 mm in length and 0.4–0.5 mm in width, lanceolate with an acuminate apex, truncate base, and serrated margins; phyllids spirally arranged on the cauloid; absence of costa; linear phyllid cells without alar or hyaline cells. The sporophyte micromorphology was pleurocarpous; seta erect, red, 18–20 mm in length; mature capsules brown; spores monad, subspheroidal, 0.012–0.016 mm in length and 0.012–0.015 mm in width. Flavonoid content showed a positive reaction with 10% NaOH reagent, indicated by a color change of the extract to brown. ANOVA and DMRT results indicated that altitude significantly affected the flavonoid content of *H. cupressiforme* var. *filiforme* extracts. The highest flavonoid content, 60.51 mg QE/g, was found at an altitude of 801–900 m a.s.l. in Baturraden Botanical Garden.

**Keywords:** *Altitudes, Baturraden, flavonoids, Hypnum cupressiforme* var. *filiforme*, *micromorphology*