

SUMMARY

Bird's eye chili (*Capsicum frutescens* L.) which many people are interested in this plant because of its high pungency and suitability for food seasoning. Bird's eye chili contains oleoresin, capsaicin, luteolin, and dihydrocapsaicin from its extract. This *C. frutescens* has high economic value in production, which is necessary to be improved. Altitudes divergence above sea level (a.s.l.) can cause environmental factor differences, especially in terms of temperature, humidity, and light intensity. Based on altitude differences, such plants must have a defense ability to survive from abiotic environmental stresses. The purposes of this research are to know the anatomical characteristics of bird's eye chili based on various altitudes and to know the relationship between anatomical characteristics of bird's eye chili leaf and various altitudes.

The research was done from December 2020 until April 2021, using an experimental design with a completely randomized design (CRD). Bird's eye chili were planted at three different altitudes, namely at Sumampir, North Purwokerto (± 100 m a.s.l.), Limpakuwus Sumbang, Banyumas (± 500 m a.s.l.) and Serang Karangreja, Purbalingga, ($\pm 1,000$ m a.s.l.) each treatment was replicated five times. Variables observed were leaf anatomical characteristics, while the parameters consisted of stomata size (length and width), the density of stomata and trichomes per mm² leaf area, leaf cuticle, epidermis, mesophyll thickness, and palisade ratio. Data were analyzed with a descriptive analytic approach and ANOVA in 95% confidence level. The results of ANOVA were significant so that it was continued with Tukey test, correlation test, and regression test using SPSS software. The results showed that anatomical characteristics of various altitudes did not correlate to the structures on a transverse section. The adaxial stomata at the three altitudes were oval-shaped. While, the abaxial stomata generally found as a rounded-shaped, except the one found at 1,000 m a.s.l. had oval-shaped. The epidermis derivatives that found can be categorized as bicellular non-glandular type of trichomes; with the basal cell, hooked, and pointed apical cell especially found in the abaxial leaf at 1,000 m a.s.l. There was a relationship between stomatal density, trichome density, epidermis thickness, and mesophyll thickness toward various altitudes. Altitude does not correlate with stomatal size (length and width), cuticle thickness, and palisade ratio.

Keywords: *altitudes, anatomical characteristics, Capsicum frutescens, phenetic relationship*