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Research Article

Integrated Evaluation of Morphological Traits and Seed Source Ripeness on the Growth and Yield Performance of Local *Capsicum frutescens* Genotypes from Gorontalo, Indonesia

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Abstract: This study aims to characterize four local chili genotypes from Gorontalo based on quantitative and qualitative traits. In addition, it seeks to determine the effects of genotype and fruit maturity on germination performance, plant growth, and yield. The research was conducted both in the laboratory and in the field. Characterization was carried out by selecting 10 plants per variety according to the applicable descriptors. Agronomic evaluation of chili plants was conducted under laboratory and field conditions. The experiment followed a randomized complete block design (RCBD) in a factorial arrangement with two treatment factors. The first factor was genotype, comprising four local varieties: Diti, Malita FM, Samia, and Siropu. The second factor was fruit maturity level, categorized as 50%, 75%, and 100% maturity. The characterization of four local chili genotypes from Gorontalo revealed significant morphological, germination, and growth-performance variations that underscore the importance of genotype and seed maturity in influencing overall plant performance. Samia and Siropu consistently demonstrated superior traits across all parameters. Malita FM showed potential for high performance but only when seeds were harvested at full maturity. In contrast, Diti displayed strong vegetative traits but poor reproductive output and low germination vigor.

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1. Introduction

Chili (*Capsicum* spp.) represents a horticultural crop of considerable agronomic and economic value, particularly in tropical and subtropical regions. It is also recognized as one of the earliest domesticated plant species in human agricultural history (Kraft et al., 2014). In Indonesia, spesifically in Gorontalo Province, *Capsicum frutescens* is widely cultivated, with numerous landraces and local genotypes having evolved through farmer-mediated selection and adaptation over generations. Beyond its agronomic value, *Capsicum frutescens* offers significant functional and nutritional benefits for human health. The fruits are rich in bioactive compounds such as capsaicinoids, carotenoids, flavonoids, and ascorbic acid, which exhibit strong antioxidant, anti-inflammatory, antimicrobial, and metabolic