

## Preliminary study on the effect of nitrogen fertilization on growth quality of *Gynura procumbens*

Mohamad Fhaizal Mohamad Bukhori<sup>a,b\*</sup>, Hawa Z. E. Jaafar<sup>a</sup>, Ali Ghasemzadeh<sup>a</sup>, Uma Rani Sinniah<sup>a</sup>

<sup>a</sup>Department of Crop Science, Faculty of Agriculture, Universiti Putra Malaysia, Serdang 43400, Selangor, Malaysia

<sup>b</sup>Centre for Pre-University Studies, Universiti Malaysia Sarawak, 94300 Samarahan, Sarawak, Malaysia

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**Abstract.** *G. procumbens* is an herbaceous medicinal plant. Despite the progressive reports on the potential pharmacological properties, many are overlooking at the importance of its agronomic requirements, especially in fertilization to produce high yields which have not been conclusively concluded. This study was carried out to examine the effects of nitrogen on growth quality. In this study of two factors, harvesting times and rate of nitrogen, a total of 12 combined treatments replicated three times with 108 plants were laid out according to randomized complete block design. Growth attributes were recorded in three harvests of triplicate samples to exhibit the trend for plant growth and quality, and statistically analysed. Nitrogen affected plant growth significantly ( $p \leq 0.05$ ) with stronger effect on physiological attributes ( $p \leq 0.01$ ). The results suggested that 0 nitrogen kg/ha at Week 12 and 90 nitrogen kg/ha at Week 4 is highly and least, respectively affected the morphology and physiology of *G. procumbens*. These attributes are controlled by the availability of usable nitrogen and agronomic management because nitrogen is needed in optimum quantity and must be in balance with other nutrients to achieve its maximum yield potential.

**Keywords:** biomass, growth, *Gynura*, nitrogen, physiology

### INTRODUCTION

*Gynura procumbens* (*G. procumbens*) is one of the important herbaceous plants in Malaysia (Mustaffa *et al.*, 2011). In recent years, the public interest on this on this plant has been increased considerably, due to its medicinal properties (Sekar *et al.*, 2014). The leaves contain major biochemical constituents such as flavonoid, phenolic, alkaloids, saponins, anthraquinone glycosides and volatile oils; with the active compounds, kaempferol-3-*O*-glucoside (7.33%) and phenolic acid (7.20%) (Mou & Dash, 2016). The total percentage of active biochemical compounds has been reported at 1.60% to 13.22% (Morat, 2013). The production of plant-based medicinal compounds is however

associated to the quality of plant material, the climate and general agronomic management. Not just the growth, but the compound contents are influenced by the plants growing environment (Caretto *et al.*, 2015). This includes fertilizer availability and uptake, which pose as one of the major factors determining productivity in agriculture. The optimum rates of fertilizer are important to ensure the growth enhancement of the plant. Adequate supply of fertilizer, especially nitrogen (N), is important for optimal growth and biomass production. Nitrogen is an essential macronutrient and interactive factor which has significant role in driving photosynthesis, growth and resource affecting secondary metabolite

\*Author for correspondence: Mohamad Fhaizal Mohamad Bukhori, Department of Crop Science, Faculty of Agriculture, Universiti Putra Malaysia, Serdang 43400, Selangor, Malaysia. Email – mbmfhaizal@preuni.unimas.my