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Response of the newly introduced plant species *Monarda citriodora* in Egypt to nitrogen fertilization and plant density

A. Salama, Reaham M. Sabry , M. Sharaf Eldin

Medicinal and Aromatic Plants Researches Department, Pharmaceutical and Drug Industries Researches Division, National Research Centre, Egypt

Abstract : The present study was aimed to develop basic production information of *Monarda citriodora* in Egypt and to determine the appropriate levels of nitrogen and plant densities for growth and essential oil content and composition. Therefore, an experiment was conducted to study the effect of three nitrogen doses (33.5, 50.25 or 67 kg N/fedden = 4200 m^2) and four plant spacing (20, 25, 30, or 35 cm between plants) in 2009/2010 and 2010/2011 seasons at the Experimental Station of the Faculty of Agriculture, Cairo University, Giza, Egypt. The medium level of nitrogen produced the highest growth parameters, yields of fresh and dry herb as well as oil yield while plant spacing of 30 cm seemed to be the optimum for plant fresh and dry weights. Plants spaced 20 cm apart gave the highest fresh, dry herb and oil yields.
Nitrogen fertilization and plant spacing slightly affected or did not dramatically change the chemical composition of the essential oil of *Monarda citriodora* **.** The chemical composition of the essential oil of the aerial parts of *Monarda citriodora* identified 17 constituents when analyzed by GC-MS. Thymol was the dominating compound in the all analyzed samples (32.73 – 63.88 %), followed by carvacrol (6.54 - 29.56%), which constituted almost 80 % of the essential oil, followed by p-cymene (1.24 - 17.72 %) and γ-terpinene (0.37-19.6%).
Keywords: Nitrogen fertilization, Plant density, *Monarda citriodora*, Yield, Essential oil.

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