



RESPONSE OF FLAX YIELD AND ITS COMPONENTS TO WATER DEFICIENCY AND NITROGEN FERTILIZER LEVELS

By

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THESIS

**Submitted in Partial Fulfillment of the
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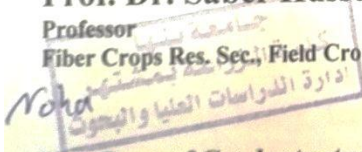
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ABSTRACT

Two field experiments were carried out at Gemmeiza Research Station, Gharbia Governorate, Agricultural Research Center, Egypt, during the two successive winter seasons of 2015/2016 and 2016/2017. The objective of this work was to study the effect of three irrigation intervals (every 21, 28 and 35 days) and four nitrogen fertilizer levels [untreated (control), 30, 45 and 60 kg N/fad] on quantity and quality of straw and seed characters of flax (Cultivar Giza 10) study also anatomical manifestation in middle technical stem length. The experimental design was split plot in three replications.

Results obtained can be summarized as follows:-

Obtained results indicate that significant differences for all studied traits among irrigation intervals or nitrogen fertilizer levels in both seasons and combined analysis. Irrigated flax plants every 21 days gave the maximum values for total plant height (cm), technical stem length (cm), upper branching zone length (cm), straw yield/plant (g), straw yield (kg/fad), total fiber percentage (%), fiber yield (kg/fad), fiber length (cm), number of capsules/plant, number of seeds/capsule, seed index (g), seed yield/plant (g), seed yield (kg/fad), biological yield (kg/fad) oil percentage (%), and oil yield (kg/fad) in the two seasons and combined analysis. On the other hand, significantly gave the minimum values of fiber fineness (Nm). In contrast, irrigation every 35 days gave the minimum values for all studied characters under this study except, fiber fineness (Nm). Irrigated flax every 28 days gain intermediate estimates in all studied traits without significance with irrigation every 21 days. Anatomical studies, *i.e.* total cross section area (mm²), cortex area (mm²), fiber area (mm²), xylem area (mm²) and pith area



(mm²), fiber index (cm³), cortex % and fiber % were increased when irrigated flax plants every 21 days, expect xylem % and pith % were decreased.

All traits of flax under study, *i.e.* total plant height (cm), technical stem length (cm), upper branching zone length (cm), straw yield/plant (g), straw yield (kg/fad), total fiber percentage (%), fiber yield (kg/fad), fiber length (cm), number of capsules/plant, number of seeds/capsule, seed index (g), seed yield/plant (g), seed yield (kg/fad), biological yield (kg/fad), oil percentage (%), and oil yield (kg/fad) showed significantly increased by increasing nitrogen fertilizer levels from untreated up to 60 kg N/fad, except fiber fineness (Nm) was significant decreased with increasing nitrogen levels in the both seasons and combined analysis. Results reported that no significant differences between soil fertilized by 45 and 60 kg N/fad on all flax traits under study. All anatomical studies were increased with increasing nitrogen fertilizer levels up to 60 kg N/fad, expect pith % was decreased.

Results showed that irrigated flax plants every 21 days and soil fertilized by 60 kg N/fad significantly gave the maximum values of technical stem length (cm) and straw yield (kg/fad) only in the second season as well as seed, biological and oil yields (kg/fad) in the two seasons and the combined analysis. In addition to great reduction in fiber fineness had happened in this case.

It could be summarized that planting flax plants (Giza 10) under irrigated interval every 21 or 28 days and soil fertilized by 45 or 60 kg N/fad to maximized quantity and quality of straw and seed yields characters as well as anatomical studies.

Keywords: Flax plant, water intervals, nitrogen fertilizer levels, growth, productivity and quality.



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