

Effect of some agricultural treatments on quality and storageability of some pea cultivars

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1 .The First Experiment :Two field experiments were carried out at the Exeprimental Farm of the Faculty of Agriculture at Moshtoher, Zagazig university during the two successive Winter growing Seasons of 1986/1987 and 1987/1988 to investigate the effect of some cultural treatments i.e. seeds sowing date, cultivar and spacing between hills on plant growth and its chemical composition as well as green pods yield and its quality of some pea cultivars(Little Marvel, Lincoln and Perfection). The obtained results can be summerised as follows.A - plant growth characteristics1-Delaying planting date from October, 15 th to November, 15 It decreased plant height, fresh and dry weight/ plant but increased the number of leaves and branches / plant .2-The three tested varieties significatly varied in all studied growth parameters where the maximum values of all studied growth characteristics were obtained by Perfection variety followed by Lincoln and the last one was Litte Marvel cv.3-increasing plant spacing from 10 to 30 cm between hills gradually decreased plant height but increased number of leaves and branches as well as. fresh and dry weight per plant.4- Generally , it may be concluded that the variety Perfection showed the highest values of plant height when seeds were sown on Oct. 15 th at 10 cm apart. However, plants of Lincoln variety produced the highest number of leaves and branches when seeds were sown at 30 cm apart on Nov. 15 112 and showed also the highest values of both fresh and dry weight per plant but on Oct 15 in the first season. However,. the variety Perfection plants were superior in the second season.B - Chemical constituents of plant foliage.B - I photosynthetic pigments1- Delaying planting date significantly decreased each of chlorophyll a, b and total as well as carotenoides leaves content.2.Lincoln var. plant leaves contained the maximum values of either chlorophyll a, b or total followed by Perfection and then Little Marvel while leaves of Little Marvel var contained the highest values for the carotenoides content . followed by Lincoln and then Perfection.3.Increasing plant spacing from 10 to 30 cm. Significantly increased a,b and total chlorophyll and also carotenoides leaves content.4.Generally, it may be concluded that plants of the variety Lincoln showed the highest values of a, b and totol chlorophyll content when seeds were sown on Oct 15112 at 30 cm apart followed by Perfection and then Littel Marvel variety while leaves of Little Marvel var. plants were the richest in the carotenoides content.B - II N,P and K content.1-Early sowing date resultled in significant increments in N, P and K uptake of leaves, Stems and whole plant during both seasons.2-Plant leaves, stems and whole plant of the var. Perfection contained the highest values of studied macroelements followed by lincoln and then Little Marvel variety at both growing seasons with the exception that lincoln variety surpassed Perfection concerning K content at the second season.3.Increasing plant spacing from 10 to 30 cm was of improving effect in this respect.4.Generally , it may be concluded that the highest N, P and K of plant foliage uptake is reported by plants of the Lincoln variety in the first season and those of Perfection in the second one when seeds were sown on Oct ,15 /1a at 30 cm apart.C - Green pods yield and its components.1-Delaying sowing date from Oct, 15th to Nov, 15th significantly increased number and weight of green pods per plant and also total green pods yield (tons/fed). However, average pod weight was not significantly affected in this respect.2-Regardless the average pod weight which was not significantly affected, the green pods number and weight per plant as well as total yield in tons per fed showed the highest values with the Little Marvelvariety followed by Lincoln and then

Perfection variety during both growing seasons of this work.3-Increasing plant spacing did not reflect any effect on average pod weight, significantly increased number and yield of green pods per plant and decreased the total yield (tons/fed).4-In general, it may be suggested that for obtaining the highest green pods yield (ton/ fed), seeds of the variety Little Marvel has to be sown on Nov, 15 lb at 10 Cm apart.

D - Physical pod characteristics

- 1-Seed sowing on Nov, 15th significantly increased number of seeds/pod and netting % than those of Oct, 15th. However, pod length and diameter were not significantly affected in this respect.
- 2-The Lincoln variety green pods showed the highest pod length and number of seeds per pod but it showed the lowest values for pod diameter and netting % . However, the maximum values for netting % and pod diameter were obtained by the Perfection variety during bothgrowing seasons.
- 3-Increasing plant spacing from 10 to 30 Cm significantly and gradually increased pod length and diameter as well! as number of seeds per pod and netting %.
- 4- In general, it may be concluded that green pods of the variety Lincoln showed the highest values of pod length and number of seeds per pod when seeds were sown at 30 Cm apart of either Oct. 15th or Nov. 15th. However, green pods of the variety Perfection showed the highest pod diameter and netting % when seeds were sown on the first or second seed sowing date at 30 Cm apart.

E - Chemical constituents of seeds

- 1-The determined chemical constituents (dry matter and N,P and K) of seeds were significantly increased with early planting date (Oct.15th).
- 2-The maximum values of all chemical constituents (N, P and K and dry matter %) of seed were obtained by Little Marvel var.
- 3-Using wide spacing (30 Cm bet.ween hills) significantly increased the macroelements green seed content and also it's drymatte %.
- 4-Generally, it may be concluded that seeds of Little Marvel var. showed the highest values of dry matter %, total N. P and K contents when seeds sowing took place on Oct. 15th at 30 Cm apart.

2- The Second Experiment. Two field and two postharvest Experiments were carried out during the two growing seasons of 1987/88 and 1988/89 for the field and during seasons of 1988 and 1989 for the postharvest experiment to study the effect of pea plants fertilization level on green pods yield and storageability in the first two experiments as well as effect of differenent postharvest treatments of pods disinfection andpacking, storage period and conditions on shelf life and keeping quality of green pea pods in the second two experiments. Otained resultswere as follows:-

- 1-Green Pods YieldThe highest used level of commerical fertilizer. i.e 200 Kg of amm. sul. + 400 Kg of cal. super. phos. + 100 Kg of pot. sul./fed showed the highest green pods yield (3.720 and 3.487 ton/ fed) at the two growing seasons of this work.
- 2-The Weight Loss Percentage- Increasing plant fertilization level gradually decreased the weight loss % of green pea pods where the lowest values in this respect were reported for the highest used level of plant fertilization (200 Kg amm. sul. + 400 Kg of cal. super. phos. + 100 Kg of pot. sul./fed). Moreover, soaking pea pods in 1% borax solution before storage significantly decreased the % of pods weight loss than either washing with tap water or not treated pods (control). Packing green pea pods in perforated polyethylene or carft packages significantly decreased % of weight loss than the control treatments (not packed). Increasing storage periods from 8 to 32 days of cold storage and from 4 to 16 day of normal room storage significantly increased the values of pods weight loss % where the highest values were obtained 32 days after cold storage or 16 days after storage at normal room temperature.The weight loss % was much higher with storage at room temperature than at cold storage conditions.For improving storageability of green pea pods and prolonging its shelf life to a suitable extent, plant fertilization at the highest used level (200 Kg of amm. sul. + 400 Kg of cal. super. phos. + 100 Kg of pot. sul./fed), pods disinfection with 1% borax solution for 5 min., packing pods in perforated polyethylene or craft Packages of one Kg before packing the exportation carton packages of 5 Kg for either 4-8 days when stored at normal room storage or 16-24 days at cold storage may be recommended to minimize the % of weight loss ofgreen pea pods.
- 3 - The Decay Percentage.Increasing pea plant fertilization level gradually decreased the decay % of pea pods where the lowest values are reported for the highest used level of plant fertilization (200 Kg of amm. sul. + 400 Kg of cal. super phos. + 100 Kg of pot. sul./fed). Soaking pea pods in 1% borax solution singificantly decreased the decay % of pods than either washing with tap water or not treated pods (control).However, packing pea pods in perforated polyethylene or craft bags significantly decreased the decay % in the second season (1989) only while no clear effects are detected in the first season (1988) in this respect at normal room storage conditions. However, no decay was observed during

the cold storage in the first season. Prolongation of the storage period more than 16 days at cold storage and 8 days after storage under normal room temperature significantly increased the decay % of green pea pods. Storing under cold conditions ($4^{\circ}\text{C} + 1$) decreased the decay % of pea green pods than that of normal room conditions ($20^{\circ}\text{C} + 2$). Generally, it may be concluded that each of higher used level of pea plants fertilization (200 Kg of amm. sul. + 400 Kg of cal. super. phos. + 100 Kg of pot. sul./fed), pods disinfection by 1% borax for 5 min., packing pods in either perforated polyethylene or craft (1 Kg) Packages before Paking in the exportation carton packages (5 Kg) for either 4-8 days when stored at normal room storage of 12-16 days at cold storage may be recommended to minimize the % of decay of green pea pods for improving storageability and for prolongation of the shelf life of such green pods to suitable extent.

4- Seed Dry Matter Percentage.

Increasing level of fertilization gradually and consistantly increased the dry matter % of seeds where the highest values are reported for the highest used level. i.e. 200 Kg of amm. sul. + 400 Kg of cal. super. phos. + 100 Kg of pot. sul./fed washing pea pods with tap water or not treated pods (control) just before storage significantly increased the dry matter % of pea seeds than using 1% borax solution . Packing green pea pods in polyethylene bags, significantly decreased the dry matter % in pea seeds than those packed in perforated craft bags or unpacked ones. Prolongation of storage period showed significant increments in dry matter % of the green pea seeds where it reached its peak at the end of storage period i.e. 24-32 days under cold storage and at 12-16 days under normal room storage conditions. Storage under normal room temperature resulted in higher dry matter % of green pea seeds than that of the cold room conditions. Generally, it may be concluded that each of higher used level of pea. Plant fertilization (200 Kg of amm. sul. + 400 Kg of cal. super. phos. + 100 Kg of pot-sul./fed), green pods washing with tap water for 5.min and not packing pods before storing for either 12-16 days when stored at normal room conditions or for 24-32 days at cold storage, may be recommended to increase the % of dry matter of pea seeds .

5 - Total Solute Solids Percentage.

Increasing plant fertilization level gradually increased T.S.S % of pea seeds where the highest T.S.S % values are reported for the highest used level of plant fertilization (200 Kg of amm. sul. + 400 Kg of cal. super. phos. + 100 Kg of pot. sul./fed). The different used treatments of green pods disinfection had no significant effect on theof T.S.S of pea seeds. Packing green pea pods in perforated polyethylene packages significantly decreased the % of T.S.S. of pea seeds than either Perforated craft packages or control (not packed). Increasing the storage periods from 8 to 32 days of cold storage and from 4 to 16 days at normal room conditions significantly decreased the values of T.S.S % in pea seeds where the lowest values in this respect were obtained after 32 days of cold storage at both the two seasons and after 16 days at the first season and after 12 days of the second season for normal room storage. Cold storage conditions ($4^{\circ}\text{C} + 1$) increased the T.S.S % of pea seeds than storing at normal room storage ($20^{\circ}\text{C} + 2$). In general, it may be concluded that each of the highest used pea plant fertilization level i.e. (200 Kg of amm. sul. +400 Kg of cal. super. phos. + 100 Kg of pot. sul./fed), pods disinfection by washing with tap water for 5 min. or without washing, packing pods in perforated craft bags or not before packing in the exportation carton packages (5 Kg) for either 4-8 days when stored at normal room storage or 12-16 days at cold storage conditions may be recommended to increase the % of T.S.S of pea seeds .

6 - The Sugars Content

Increasing plant fertilization level gradually increased reducing, non-reducing and total sugars-of pea seeds where the highest sugars values are reported for the highest used level of plant fertilization (200 Kg of amm. sul. + 400 Kg of cal. super. phos. + 100 Kg of pot. sul./fed). Soaking pea pods in 1% borax salution either significantly decreased or had no effect on the % of sugars (reducing- non-reducing and total sugars) of pea seeds than either washing with tap water or control. Packing green pea pods in perforated polyethylene packages significantly decreased % of reducing and total sugars than either perforated craft packages or control. However, the non-reducing sugars were not significantly affected in this respect. Increasing the storage periods from 8 to 32 days of cold storage and from 4 to 16 days or 4 to 12 days at normal room conditions decreased the values of sugars (reducing, non-reducing and total sugars) % of pea seeds where the lowest values in this respect were obtained after 32 day of cold storage at both the two seasons; and after 16 or 12 days at first and second seasons respectively at normal room storage. Cold storage conditions ($4^{\circ}\text{C} + 1$) increased the sugars % of pea seeds than storing at

normal room storage (20'0 + 2). Generally, it may be concluded that each of the highest used pea plant fertilization level (200 Kg of amm-sul. + 400 Kg of cal. super. phos. + 100 Kg of pot. sul./fed),soaking pea pods in tap water for 5 minutes or not, packing pods in perforated craft (1 Kg) backages or not before backing in the exportation corton packages (5 Kg) for either 8-12 days when stored at normal storage or 16-24 days at cold storage may be recommended to decrease loss in the sugars % of pea seeds.