EFFECT OF PLANT NUTRITION, TIME AND METHOD OF HARVESTING ON SEED YIELD AND QUALITY OF WRINKLED AND SMOOTH-SEEDED PEA(*Pisum sativum* L.)VARIETIES.

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ABSTRACT

Effects of nitrogen(N), phosphorus(P) and time and method of harvesting on seed yield and quality were examined for smooth(Maple) and wrinkled(Pania)-seeded pea cultivars. These cultivars were grown under field conditions, and at different rates of N(0, 100 and 200 kg N/ha) and P(0 and 250 kg superphosphate/ha). Seed was harvested at 3 different times(35%, 25% and 15%SMC), and shelled either by hand or by a combine-harvester(at 1,350rpm). For hand-shelling, 120 plants were sampled from each plot of which 40 plants were used to determine the number of pods/plant, seeds/pod and 1000-seed weight, and subsequently used to determine seed quality i.e. Standard Germination, Accelerated Aging, Conductivity and incidence of Hollow Heart. The remaining 80 plants from each plot were used for separation into bottom, middle and top pods and subsequently used to determine 1000-seed weight, seed germination, conductivity and the incidence of hollow heart.

For machine-threshing, 120 plants were sampled from each plot, threshed by combine-harvester and seed subsequently used to determine seed quality by 1000-seed weight, Standard Germination Test, Accelerated Aging, Conductivity Test and incidence of Hollow Heart. Samples from each plot, following machine-threshing, were also used to determine seed damage by visual observation and by the Ferric Chloride Test.

Pea cv. Pania produced higher seed yield than cv. Maple in both hand-shelling and machine-threshing due to a much higher numbers of seeds/pod(5.76 and 3.57 seeds/pod, respectively) and much lower mechanical damage(10.32% and 27.98%, respectively), but had a much lower capacity to produce seed of high vigour than cv. Maple.

Application of nitrogen increased seed yield of both hand-shelled and machine-threshed seeds due to increased numbers of pods/plant, whereas yield was not directly affected by phosphorus addition. However, interaction between 100kg N/ha and 250 kg superphosphate/ha decreased seed weight. Application of nitrogen also increased seed vigour as expressed by increased seed germination percentage after accelerated aging, decreased hollow heart incidence and decreased conductivity value, particularly in cv.Pania. Application of phosphorus had only a small effect on

seed vigour compared with that of nitrogen. Neither seed germination percentage nor mechanical damage was affected by application of nitrogen or phosphorus.

Hand-shelling at different seed moisture contents did not affect seed germination percentage or conductivity value of either cultivar, but delaying the harvest(at the lower seed moisture content) decreased seed vigour in cv. Pania, as expressed by decreased seed germination percentage after accelerated ageing and increased hollow heart incidence. Machine-threshing at different seed moisture contents resulted in different degrees of seed damage, and decreased seed vigour in both cultivars. The most severe damage in cv. Maple occurred when machine-threshed at 15%SMC, whereas in cv. Pania it occurred at 35%SMC. Least damage occurred at 35% and 25%SMC in cv. Maple and cv. Pania, respectively. Unlike hand-shelling, machine-threshing at lower seed moisture content resulted in higher seed vigour in both cultivars, suggesting that bruising which occurs mainly at the high seed moisture content is more harmful than splitting which mainly occurs at the low seed moisture content threshing, in terms of decreasing seed vigour.

The top pods on pea plants produced seeds with lower seed weight in both cultivars, with higher hollow heart incidence in cv. Pania and with higher conductivity value in cv. Maple, than middle and bottom pods. Application of 200 kg N/ha and 250 kg superphosphate/ha improved vigour of seed from different pod positions to a similar and high level.

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