

## استخدام الاهتزازات الصوتية في تقييم خواص الجودة للبيض

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### USING ACOUSTIC RESONANCE FREQUENCY IN EVALUATION FOR EGGS QUALITY PROPERTIES

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**ABSTRACT:** *The incidence percent of broken and cracked eggs ranged from 6% to 8% of all produced eggs. Breaking force strength has proven to be closely related to the proportion of broken eggs but the relationship with non-destructive measurements is not yet clear. Therefore, the relationship of resonance frequency and the dynamic stiffness with breaking force strength was measured as a non-destructive alternative. It seems to be necessary, to develop other measurements for estimating eggshell quality without destroying the egg shell. Four samples of 437 eggs, collected from the poultry farm, Faculty of Agriculture, Minoufiya University, first sample consisted of Norva and Sina, (129 and 68 eggs, respectively), second was collected from El Wady Company for poultry production, Hie-linen and Lohman (120 for each strain) and were used for analysis, acoustic impulse (using an acoustic crack detection device), besides measuring the breaking force strength. Calculations from dynamic stiffness have stronger influences on breaking force strength. Shell breakage strength, shell thickness, dynamic stiffness and shell mass had the best coefficients of correlation. Also it was the best assessment for practical large scale uses, because the characteristics of egg shell quality changes from strain to another. Intact eggs produced sound signals mainly exhibiting a single dominant peak in the frequency range of 430 and 8613Hz with signal duration of about 112 ms. The cracked eggs showed frequency spectra in relatively wider frequency range of 1420 to 12,273Hz and shorter signal duration of about 5ms. It was concluded that, the influence of the material strength (breakage force) upon total eggshell strength (crack detector) is limited. The commercial egg measurements showed that, dynamic stiffness accurately predicted which eggs would crack as they passed through the gathering and processing system. Thus the method could be used to sort out eggs likely to crack and remove them prior to cartooning.*

**Key words:** *Egg quality, physical egg quality parameters, acoustic resonance frequency, breaking force strength and dynamic stiffness.*

***USING BENCHMARKING PROGRAM (IGRA) IN HUMID AND ARID REGIONS FOR EVALUATING IRRIGATION SYSTEMS PERFORMANCE***

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***ABSTRACT:***

Improving the use efficiency of the available water resources for crop production in both humid and arid areas is considered one of the most important factors of irrigation water management. The aim of this study was to apply the Benchmarking IGRA program in both humid and arid areas in order to evaluate the irrigation performance in these areas. The irrigation performance was evaluated in Uelzen- Germany as an example of humid area and the study was carried out through 10 years. Egypt was divided into three zones (Kafer El-Sheikh " El-Giza " Suhag) and was considered as an example of arid region. The maximum output revenue in the humid area per unit irrigated area 2609 \$/ha, while the lowest was 1987 \$/ha. The highest output revenue per unit irrigated area was in arid region was 740 \$/ha observed in Kafer El-Sheikh with traditional irrigation system. While, with the modified surface irrigation system, the highest value was 901 \$/ha achieved in El-Giza zone.

***Key words:*** Benchmarking (IGRA) program, irrigation performance evaluation, irrigation water management in humid

***EFFECT OF VIBRATORY CHISEL PLOW ON POWER REQUIREMENTS AND SOIL PHYSICAL PROPERTIES***

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**ABSTRACT:**

The aim of this research was to study the effect of vibratory chisel tool on soil physical properties, power requirements and grain wheat yield compared with traditional chisel plow (without vibration). A mathematical model on Matlab program version-7 was build to predict the power requirements for both traditional chisel plow and vibratory chisel plow. Two field experiments were carried out to verify the proposed model. First one was conducted by chisel plow without causing vibration to the shanks (fixed shanks) at three levels of forward speed (1.98, 2.70 and 3.42 km/h). The second was conducted by chisel plow while causing vibration to the shanks at the same levels of forward speed with three levels of angular velocity (50, 55 and 60 cycle/sec) and three levels amplitude (0.06, 0.07 and 0.08 m). The results indicated that using of vibrated shanks of the chisel plow lead to improving soil physical properties, increasing wheat crop yield and decreasing both of total cost and power requirements per wheat crop yield. However, increasing the power consumption was due to the additional consuming of power in vibrated shanks compared with traditional chisel plow (without vibration). Applying the mathematical model, which was built by Matlab, program proved higher efficiency in predicting the power requirements for chisel plow (with vibration and without vibration) where, the correlation coefficient (R<sup>2</sup>) was 0.95 between both the measured and predicted values.

**Key words:** Vibratory chisel plow “ Mathematical model “ Power requirements “ Soil physical properties “

***GROWTH, YIELD, QUALITY AND WATER USE EFFICIENCY OF PEA (*Pisum sativum* L.) PLANTS AS AFFECTED BY EVAPOTRANSPIRATION ( $E_{To}$ ) AND SPRINKLER HEIGHT.***

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**ABSTRACT:**

A field experiment was carried out during the two successive winter seasons of 2004-2005 and 2005-2006 at the Experimental Farm of Minufiya University in Sadat city, Egypt. The soil was sandy in texture. The aim of this investigation was to study the effect of irrigation treatments and sprinkler height on growth, yield quality and WUE of peas (*Pisum sativum* L.) variety Lincoln. Results exhibited that increasing irrigation level up to 100%  $E_{To}$  increased vegetative growth (plant height, branches no., leaves area, flowers no. and pods no. / plant, fruit set % as well as dry matter of stems, leaves, pods, roots and total plant) and green pods and dry seeds yields / fed. Pod length exhibited its highest value when plants were subjected to water deficit (60%  $E_{To}$ ) whereas; irrigation at either 80 or 60%  $E_{To}$  had equal effect and showed the lowest pod length values. WUE for green pods and dry seeds yields showed the highest values when pea plants were irrigated at 80%  $E_{To}$ , while 60%  $E_{To}$  exhibited the lowest values. Generally, installation of sprinklers at 75 cm height produced tallest pea plants and higher leaves area / plant and fruit set %. However, dry matter of stem, leaves, roots, pods and total plant exhibited their highest values when sprinklers were positioned at 50 cm height. Flowers no. /plant was not affected by sprinkler height. The highest values of green pods yield/ fed., dry seeds yield/ fed., and pod length as well as pod weight were attained at 50 and/ or 75 cm sprinkler height. Moreover, the highest values of water use efficiency (WUE) for both green pods and dry seeds yields were detected at 75 cm sprinkler height. It could be concluded under the conditions of the experiment or any other similar conditions that pea plants can be irrigated by 100% and/or 80%  $E_{To}$  with sprinkler height 75 cm for obtaining higher green pods yield/ fed. , dry seeds yield/ fed. and WUE .

**Key words:** *Pisum sativum*, irrigation treatments, sprinkler height, yield, quality.

***IRRIGATION WATER UNIFORMITY DISTRIBUTION FOR IMPACT  
SPRINKLERS***

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***ABSTRACT:***

Three types of impact sprinklers (low, moderate and medium pressure) were tested by the aim of deriving the relationship between the operating pressure and the uniformity coefficients, Christiansen coefficient of uniformity (CU) and distribution uniformity (DU) in addition to their affect with both wind speed and the height of riser. An experimental layout was constructed and included all the required devices for measuring (CU) and (DU) and adjusting the system (centrifugal pump, sandy filter, pressure regulator, pressure gauge, flow meter, and a relief valve). The highest values of (CU) and (DU) were 94.98% and 90.63% respectively recorded at 350 and 325 kPa of the operating pressure for impact medium sprinklers at 1m height of riser. The combination of wind speed and riser height affected strongly the values of both (CU) and (DU), where the higher decrease in (CU) was about 4.83% and was about 7.68% for (DU) if the riser height increased from 1 to 1.5m. Impact moderate pressure sprinklers achieved the highest percent of drift losses at 1 and 1.5m of riser height comparing with the other tested impact sprinklers. The highest drift losses percent was (23.43%) observed with impact moderate sprinkler at 1m height of riser and 225kPa of operating pressure.

***Key words:*** Impact sprinklers, uniformity coefficient for impact sprinklers, wind speed and riser height, unifor