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Development and Testing of Single Row Animal Drawn Groundnut Planter

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Abstract

This project was undertaken to develop and test the performance of a planter that capable of planting groundnut at predetermined spacing and depths. The planter, consisting of a frame, seed hopper, seed metering devices, seed tube/spout, adjustable furrow openers and covering device, and drive wheels. Physical properties of seeds involved in the study were investigated to optimize the design of planter's components. Field testing was conducted in two locations namely at Boko and Erer substations of different soil types. In this experiment, two types of sowing methods were used, the animal drawn planter and manual sowing. The animal drawn planter is simple in design and easily operated and can be maintained by farmers. Randomize complete plot with four replications were used with plot size of 20 x3m^2. The data was analyzed by two sample t-test statistical analysis of mean values, t- values and probability levels at 95% confidence interval. The parameters observed were sowing time, depth of sowing, speed of sowing, row spacing and plant spacing. The results showed that there were highly significant differences between the animal drawn groundnut planter and manual for a parameter such as time for sowing, depth of sowing and speed of sowing. The animal drawn planter saves sowing time and labor requirements when compared to manual sowing. It also gave better average seeding rate for planter 82 kg/ha than that of manual treatment (93 kg/ha). Effective field capacity and field efficiency of the planter was 0.08 ha/hr. and 73% respectively. Hence, it is recommended that this efficient planter will be upgrade the planting rows in future design in multi row planter for increasing planting capacity per unit time.

Keywords: Ground nut, Animal drawn, groundnut planter, single row planter.

REFERENCES

[1]. Bangarwa, A.S., Kairon, M.S. and Singh, K.P., 1988. Effect of plant density, level and proportion of nitrogen fertilizer on growth, yield and yield components of winter maize. Haryana Agric. Univ. Ind. J. Agri. Sci., 58(11): 854-856.

[2]. Brocklehurst, P.A., 1985. Factors affecting seed quality in vegetable crops. Scientific Horticulture, 36: 48–57.

[3]. Central Statistical Agency (CSA), 2013. Revised report on the 2012 / 2013 private peasant holdings, *Meher* season, area and production of major crops survey. Statistical Bulletin 532. Addis Ababa, Ethiopia.

[4]. Chaudhuri, D., 2001. Performance evaluation of various types of furrow openers on seed drills. A review Journal of Agricultural Engineering Research, 79(2): 125–137.

[5]. Davies R M 2009. Some physical properties of groundnut grains. Res. J. App. Sci. Engg. Tech. 1: 10–13

[6]. FAO, 2000: Guidelines and reference material on integrated soil and nutrient management and conservation for farmer field schools. AGL/MISC/27/2000. AGL, FAO, Rome, Italy. 164 p.

[7]. Griepentrog, H.W, 1998. Seed distribution over the area. European Society of Agricultural Engineers, Oslo, Norway.

[8]. Ikechukwu I.B., Gbabo A. and Ugwuoke I.C., 2014. Design and Fabrication of a single row maize planter for garden use. *Journal of Advancement in Engineering and Technology, 1(2):2348-2931.*

[9]. Jayan, P.R. and Kumar, V.J.F., 2004. Planter design in relation to the physical properties of seeds. *Journal of Tropical Agriculture*, *42*, pp.69-71

[10]. Jouki, M. and Khazaei, N., 2012. Some physical properties of rice seed (Oryza sativa). *Research journal of applied sciences, engineering and technology*, *4*(13), pp.1846-

[11]. Karayel, D. and Ozmerzi, A., 2001. Effect of forward speed and seed spacing on seeding uniformity of a precision vacuum metering unit for melon and cucumber seeds. *Turkey Journal of Agriculture, 14(2): 63-67.*

[12]. Karayel, D. and Ozmerzi, A., 2002. Effect of tillage methods on sowing uniformity of maize. *Canadian Biosystems Engineering, 44(2): 23-26.*

[13]. Karayel, D., 2009. Performance of a modified precision vacuum seeder for no-till sowing of maize and soybean. Soil & Tillage Research, 104: 121–125.

[14]. Kebede, Y., Gunjal, K. and Coffin, G., 1990. Adoption on new technologies in Ethiopian agriculture: the case of Tegulet-Bulga district, shoa province. Agricultural Economocs, 4(1):27-43.

[15]. Kepner, R.A., Bainer, R., Barger, E.L., 1978. Principles of Farm Machinery, 3rd edition.Inc. AVI Publishing Company, Westport, USA.

[16]. Makki E. K. and Mohammed E. O. (2011). A survey on draught animal technology (DAt) in En-nhood area, north kordofan state, Sudan, Tropical animal health and production, published on line (springer).PP. .

[17]. Olaoye, J.O. and Bolufawi S.J., 2001. Design, fabrication and performance of Multipurpose row planting machine. J. Sustain Agric. Environ, 3(1): 7-20.

[18]. Perry, D.A., 1982. The influence of seed vigour on vegetable seedling establishment Scientific Horticulture, 33: 67–*75*.

[19]. Robinson, R.G, Ford, J.H., Lueschen, W.E., Rabas, D.L., Smith, L.J., Warnes, D.D. &Wiersma, J.V., 1981. Response of sunflower to plant population. Agronomy Journal, 72:869-871.

[20]. Shaaban, U.A., Afify, M.T., Hassan, G. E. and El-Haddad, Z.A., 2009. Development of avacuum precision seeder prototype for onion seeds. Misr Journal of Agricultural Engineering, 26(4): 1751-1775.

[21]. Soyoye, B. O., O. C. Ademosun, and E. O. Olu-Ojo. 2016. Manually operated vertical seed-plate maize planter. *CIGR Journal*, 18(4): 70-80.

[22]. TarigEltayeb Ahmed, Sawsan Kamal Eldin, Hassan MohamoudAbdalla, MohamoudYasirEbrahim Ahmed SalihElagabElsheikh, 2013. Performance of Animal Drawn Planter on Establishment and Productivity of Groundnut in North Kordofan of Sudan. *Greener Journal of Agricultural Sciences ISSN: 2276-7770 Vol. 3 (8), pp. 628-636*

[23]. Tessier, S., Saxton, K.E., Papendick, R.I. and Hyde, G.M., 1991. Zero-tillage furrow opener effects on seed environment and wheat emergence. Soil & Tillage Research, 21(3):347–360.

[24]. Thomas, H. and Brown, J., 2005. Marks Calculation for Machine Design, McGrawHill,New York.

[25]. Wollin, A. S., McPhee, J. E., Robotham, B. G. and P. A. Walsh (1987). A review of engineering aspects of crop establishment. In: I. M. Wood, W. H. Hazard and F. R. From (Editors), Crop Establishment Problems in Queensland: Recognition, Research and Resolutions. Occas. Publ. No. 34, Australian Institute of Agricultural Science, Brisbane, Qld., 42–61.