Original Research Article

Effect of seed priming and coating through micronutrient application on growth and seed yield of groundnut (*Arachis hypogaea* L.)

ABSTRACT

Groundnut (*Arachis hypogaea* L.) is a major oilseed crop which ranks 3rd among the oilseed crops of the world. It is one of the chief vegetable oil sources in the world. The kernel of groundnut contains 46-52 per cent oil, 18 per cent carbohydrates and 25-30 per cent crude protein. Micronutrients are vital for plant growth and human health. Soil and foliar applications are the most prevalent methods of micronutrient addition. However, the cost involved and difficulty in obtaining high quality micronutrient fertilizers are major concerns with these in developing countries. Micronutrient seed treatments, which include seed priming and seed coating, are an attractive and easy alternative. So, the aim was to provide micronutrient fortified seed to the farmers for better yield advantage. A field experiment was conducted during *Rabi* season of 2018-19 and 2019-20 at the experimental farm, OUAT, Bhubaneswar to study the effect of seed priming and coating through micronutrient application on growth and seed yield of groundnut (*Arachis hypogaea* L.) with 21 different treatment combinations, laid out in Randomised Block Design (RBD) with three replications. Parameters measured were plant height, number of branches per plant, number of nodules per plant, days to 50% flowering, days to maturity and seed yield. The experimental findings revealed that the treatment (T_{17}) seed priming with 0.5 g/l borax solution + 0.5 g/l sodium molybdate solution performed significantly (0.05 or 5% level) higher than other treatment i.e., plant height of 11.61 cm, 29.73 cm and 39.91 cm at 30, 60 and 90 DAS, numbers of branches per plant, i.e., 5.84, 7.41 and 9.10, number of nodules per plant 44.66, 57.76, and 29.88 at 45 DAS, 60 DAS and harvest time, least number of days to reach 50% flowering (25.57 days), least number of days to reach maturity i.e., 111.45 days and higher seed yield per hectare, i.e., 1565.70 kg ha^{-1}. Molybdenum treatments recorded higher plant growth parameters as compared to boron application, whereas, boron application comparatively recorded higher yield attributing parameters and seed yield over molybdenum application. In general, seed priming treatments either with borax or sodium molybdate proved to be more effective than the seed coating treatments.

Keywords: boron, molybdenum, groundnut, seed priming, seed coating, growth parameters, seed yield

1. INTRODUCTION

Groundnut (*Arachis hypogaea* L.) is a crop of global importance. Due to its high oil content, it is categorised as both a grain legume and an oilseed crop. It is cultivated worldwide on almost all types of soil. The groundnut is an excellent plant based source of protein (25-36%) and vegetable oil (47-53%) (Jeyaraman, 2017). Micronutrient insufficiency is one of the main reasons for the low yield of groundnuts. Intensification of agriculture, usage of straight fertilisers, rising crop requirements due to increasing productivity levels have increased the micronutrients demand in soil fertility management and are increasingly becoming major constraints to achieve agricultural production.

Analysis of soil and plant samples has indicated that 49% of soils in India are potentially deficient in Zn, 12% in Fe, 5% in Mn, 3% in copper (Cu), 33% in boron (B) and 11% in molybdenum (Mo). (Singh, 2008). , indicating that the deficiencies of micronutrients in soils have become serious constraints for crop production. Now-a-days boron deficiency is basically an all India concern and in Odisha 80% of soils are B deficient, Dixit *et al*. (2020). In 1980 the extent of B deficiency was about 2% and it has increased to 18.3% in just 32 years in India, Shukla *et al*. (2014).

Molybdenum is involved in enzyme systems relating to nitrogen fixation by bacteria growing symbiotically with legumes. Molybdenum also has an impact on protein synthesis, sulphur metabolism, and nitrogen metabolism. Because molybdenum has a significant impact on pollen production, plants lacking in molybdenum have problems producing fruit and grains. Molybdenum is also a component of the enzyme nitrogenase, which is required in N fixation and plays a role in P utilisation. Because of involvement of Mo in nitrogen fixation, legumes require more molybdenum than cereals and are hence more vulnerable to low molybdenum levels in soil. Molybdenum is also claimed to be crucial for absorption and transport of iron in plants (Subba Rao and Adinarayan, 1995).

Boron plays a dynamic role in various plant structural, physiological and biochemical functions including cell wall formation and stability, maintenance of structural and functional integrity of biological membranes, plasma membrane electron transport reactions, carbohydrate metabolism and transport of sugar, phenol and auxin metabolism, root elongation and nucleic acid metabolism, nitrogen fixation and nitrate assimilation, water relations stimulated, movement of sugar or energy into growing parts of plants, plant reproduction, pollen tube growth and pollen germination, pollination, seed set and disease resistance, Arunkumar *et al*., 2018. Therefore, the amount, method and timing of application of micronutrient fertiliser to the groundnut crop has a major impact on yield and quality (Veeramani and Subrahmaniyan, 2011).

The most common ways to supply micronutrients are through soil and foliar applications, but in underdeveloped nations, both approaches are limited by high-quality micronutrient fertiliser availability and expense. Micronutrient seed treatments, which include seed priming and seed coating, are an attractive and easy alternative. Micronutrient application through seed treatments improves the stand establishment, promotes phenological events and boosts yield and micronutrient grain contents in most situations. In most cases, micronutrient application through seed treatment performed better or similar to other application methods. The delivery of micronutrients through seed treatments is simple and affordable, making it a desirable choice for farmers with limited resources, according to Farooq *et al.* (2012). The knowledge on various Mo and B concentrations and their combinations in groundnuts, however, is scant. Keeping in mind these factors, a study was conducted to determine how growth parameters and seed yield of groundnut were affected by the delivery of micronutrients through seed.

2. MATERIALS AND METHODS

2.1 Seed priming and coating treatment

The present study was undertaken to examine the effect of micronutrient delivery to groundnut by seed priming and coating procedures for increasing the crop growth characteristics and seed yield. Seeds of groundnut cultivar ICGV-91114 (Devi) was taken for the experiment. After initial germination test, the seeds were subjected to various seed priming and coating treatments using borax and sodium molybdate as the sources of the micronutrients, boron and molybdenum. After priming and coating procedures, seeds were dried back to original moisture content, followed by germination tests. The treated seeds were sown in the field to study their field performance.

2.2 Experimental site, design and treatments

This field experiment was conducted during *Rabi* season of 2018-19 and 2019-20 at the experimental farm of Odisha University of Agriculture and Technology, Bhubaneswar,followed Randomized Block Design with three replications. For comparison, the micronutrients were also applied as basal soil application and foliar sprays to the crop, along with an untreated Control. There were 21 treatments in total.

Chart 1 : Treatment combinations details

Treatments	
T_1	Seed priming with borax 0.1 g/l
T_2	Seed priming with borax 0.5 g/l
T_3	Seed priming with borax 1 g/l
T_4	Seed coating with borax 100 mg/kg seed

T_5	Seed coating with borax 200 mg/kg seed
T_6	Seed coating with borax 300 mg/kg seed
T_7	Foliar spray of borax 100 ppm, 2 sprays (at 20 DAS and 30 DAS)
T_8	Soil application of borax 10 kg/ha
T_9	Seed priming with sodium molybdate 0.25 g/l
T_{10}	Seed priming with sodium molybdate 0.50 g/l
T_{11}	Seed priming with sodium molybdate 0.75 g/l
T_{12}	Seed coating with sodium molybdate 2 g/kg seed
T_{13}	Seed coating with sodium molybdate 4 g/kg seed
T_{14}	Seed coating with sodium molybdate 6 g/kg seed
T_{15}	Foliar spray of sodium molybdate 50 ppm, 2 sprays (at 20 and 30 DAS)
T_{16}	Soil application of sodium molybdate 1.5 kg/ha
T_{17}	$T_2 + T_{10}$
T_{18}	$T_5 + T_{13}$
T_{19}	$T_7 + T_{15}$
T_{20}	$T_8 + T_{16}$
T_{21}	CONTROL

Observations on various plant growth and yield parameters, such as, plant height at 30, 60 and 90 DAS, number of branches per plant at 30, 60 and 90 DAS number of nodules per plant at 45, 60 DAS and at harvest time, days to 50% flowering, days to maturity and seed yield per hectare after harvest were taken.

2.3 Observations recorded

Ten plants from each plot were randomly selected and tagged for taking all the field observations. The data were recorded and mean of ten plants calculated.

2.3.1 Plant height

The height of the ten selected plants was measured from base to the tip by help of a measuring scale and average plant height was calculated and expressed in centimetres.

2.3.2 Number of branches per plant

The number of branches in each of the selected plants in each plant was counted at 30, 60, 90 days after sowing and the mean number of branches calculated.

2.3.3 Number of nodules per plant

Total number of nodules from ten uprooted plants in each plot was counted at 45 DAS, 60 DAS and at harvest and mean number of nodules per plant calculated.

2.3.4 Days to flowering initiation in 50% plants

The number of days taken from sowing to appearance of flowers in 50% of the plants in each plot was recorded.

2.3.5 Days to maturity

The number of days taken from sowing to harvestable maturity stage as judged by morphological indices was recorded for each variety. The crop was considered ready for harvest when leaves started yellowing, original seed colour developed on the kernel and some of the leaves fell down. The pods developed blackish streaks on the inside of the shell, the pods became reticulated and within it the seed was separated from the shell of the pod.

2.3.6 Seed yield per hectare

Plants were uprooted from net plot area and all matured pods were plucked. Harvested pods were cleaned by removing adhered soil and immature pods. These mature pods were dried completely (below 8% moisture level) and weighed. On the basis of seed yield obtained in the net plot, seed yield per hectare was calculated.

2.4 Statistical analysis

The experimental data obtained was subjected to statistical analysis adopting Fischer's method of analysis of variance as outlined by Gomez and Gomez (1984). Critical Difference (C.D.) values were given in the results tables at 5 per cent level of significance, whenever the F test was significant at 5 per cent level.

3. RESULTS

3.1 Plant height

Plant height was recorded at 30, 60 and 90 days after sowing and the pooled mean values are provided in Table 1. Irrespective of treatments, the plant height increases with the age of the plant. In general, seed priming treatments either with borax solutions or sodium molybdate solutions recorded higher plant height than seed coating treatments with borax or sodium molybdate. Among the treatments, seed priming with 0.5 g/l borax solution + 0.5 g/l sodium molybdate solution (T_{17}) recorded maximum plant height of 11.61 cm, 29.73 cm and 39.91 cm, followed by seed priming with 0.50 g/l sodium molybdate solution (T_{10}), i.e., (10.70, 27.63 and 39.88) cm at 30, 60 and 90 DAS, respectively. The treatment T_{17} was considerably superior than other treatments for 30 DAS and 60 DAS, however for 90 DAS, treatments such as (T_{10}), (T_{11}), (T_9), (T_{19}) and (T_{15}) also recorded greater plant height, which were statistically at par with the best treatment (T_{17}). Among the treatments, at 90 DAS seed priming with 0.5 g/l borax solution + 0.5 g/l sodium molybdate solution (T_{17}) recorded highest percent increase over Control which was 26.24%, followed by seed priming with 0.5, 0.75 and 0.25 g/l sodium molybdate solution and the percent increase values were 26.16%, 25.84% and 25.15%. Least percent increase in plant height over Control was reported in soil treatment with 10 kg/ha borax (T_8) which was 7.19% (Fig 1).

3.2 Number of branches per plant

Number of branches per plant was recorded at 30, 60 and 90 days after sowing and the pooled mean values are provided in Table 2. Irrespective of treatments, the number of branches per plant increased with the age of the plant. In general, seed priming treatments either with borax solutions or sodium molybdate solutions recorded higher number of branches per plant than seed coating treatments with borax or sodium molybdate. Among the treatments, seed priming with 0.5 g/l borax solution + 0.5 g/l sodium molybdate solution (T_{17}) recorded maximum numbers of branches per plant, i.e., 5.84, 7.41 and 9.10 followed by seed priming with 0.50 g/l sodium molybdate solution (T_{10}), i.e., 5.61, 7.18 and 8.87.At 30 DAS seed priming with 0.75 g/l sodium molybdate solution (T_{11}) recorded 5.58 numbers of branches per plant which was statistically at par with the best treatment. At 60 DAS, results showed that treatments such as seed priming with 0.75 g/l sodium molybdate solution (T_{11}) and seed priming with 0.25 g/l sodium molybdate solution (T_9) were statistically at par with the best treatment (T_{17}). At 90 DAS, the results showed that the treatments foliar application of 100 ppm borax solution + foliar application of 50 ppm sodium molybdate solution (T_{19}) and foliar application of 50 ppm sodium molybdate solution (T_{15}) were statistically comparable to the best treatment (T_{17}). The lowest plant height was recorded in untreated Control (T_{21}) at 30, 60 and 90 DAS for both cropping seasons. Among the treatments, at 90 DAS seed priming with 0.5 g/l borax solution + 0.5 g/l sodium molybdate solution (T_{17}) recorded highest percent increase over Control which was 20.79%, followed by seed priming with 0.5, 0.75 and 0.25 g/l sodium molybdate solution and the percent increase values were 17.75%, 17.34% and 16.54%. Least percent increase in number of branches per plant over Control was found in soil treatment with 10 kg/ha borax (T_8) which was 5.83% (Fig 2).

3.3 Number of nodules per plant

Number of nodules per plant was recorded at 45 DAS, 60 DAS and at harvest time and the data presented in Table 3. Borax or sodium molybdate seed priming treatments generally resulted in a higher number of nodules per plant than borax or sodium molybdate seed coating treatments. The treatments with the highest number of nodules per plant were seed priming with 0.5 g/l borax solution + 0.5 g/l sodium molybdate solution (T_{17}), which recorded 44.66, 57.76, and 29.88 at 45 DAS, 60 DAS, and harvest time. The treatment with the second highest number of nodules per plant was seed priming with 0.50 g/l sodium molybdate solution (T_{10}), which recorded 42.49, 55.58 and 28.30. The treatment T_{17} was considerably superior than all treatments for 45 DAS, 60 DAS and at harvest time. Additionally, greater plant height was observed when borax and sodium molybdate were applied together via foliar spray and soil application, respectively, at rates of 10 kg/ha of borax and 1.5 kg/ha of sodium molybdate. The lowest number of nodules per plant was recorded in untreated Control (T_{21}) at 45 DAS, 60 DAS and at harvest time for both cropping seasons.At 60 DAS, the treatment with the highest percent increase over Control was seed priming with 0.5 g/l borax solution plus 0.5 g/l sodium molybdate solution (T_{17}). This treatment was followed by seed priming with 0.5, 0.75, and 0.25 g/l sodium molybdate solution, with percent increase values of 52.37%, 52.24%, and 50.24%. Least percent increase in number of nodules per plant over Control was recorded in soil application of 10 kg/ha borax (T_8) which was 5.41% (Fig 3).

3.4 Days to 50% flowering

Number of days required to reach initiation of flowering in 50% plants in each plot was recorded for both cropping seasons and the pooled mean values presented in Table 4. In general, seed priming treatments using borax or sodium molybdate solutions recorded fewer days to reach 50% flowering than seed coating treatments using borax or sodium molybdate (Fig. 4). Among the treatments, seed priming with 0.5 g/l borax solution+ 0.5 g/l sodium molybdate solution (T_{17}) took least number of days to reach 50% flowering (25.57 days), followed by seed priming with 0.50 g/l sodium molybdate. Other treatments such as T_{11}, T_9, T_{19}, T_{15} and T_3 showed statistically at par result with the best treatment (T_{17}). The number of days to 50% flowering was reduced in case of seed priming treatments in comparison with seed coating treatments. Maximum number of days taken to 50% flowering was in case of untreated Control, i.e., 33.39 days.

3.5 Days to maturity

Number of days required to reach maturity was counted based on maturity indices in each plot for both cropping seasons and the pooled mean values presented in Table 4. In comparison to seed coating treatments with borax or sodium molybdate, seed priming treatments with micronutrients recorded the lowest number of days to maturity. Among the treatments, 0.5 g/l borax solution + 0.5 g/l sodium molybdate solution (T_{17}) took least number of days (111.45 days) to reach maturity, followed by seed priming with 0.50 g/l sodium molybdate solution (T_{10}) (111.70 days) (111.70 days). T_{11}, T_9, T_{19}, T_{15} and T_3 were at par with the best treatment, i.e., T_{17}.

3.6 Seed yield per hectare

Total seed yield from each plot was recorded and converted to seed yield per hectare for both cropping seasons. The pooled mean data are presented in Table 4. In general, seed priming treatments, either with borax solution or sodium molybdate solution gave higher seed yield per hectare compared to seed coating treatments, foliar spray and soil application. Among the treatments, seed priming with 0.5 g/l borax solution + 0.5 g/l sodium molybdate solution (T_{17}) gave maximum seed yield of 1565.70 kg/ha, followed by seed priming with 1 g/l borax solution (T_3), i.e., 1537.59 kg/ha. The treatment T_{17} was significantly superior over all treatments except T_1, T_2, T_3 and T_{10}. Lowest seed yield per hectare (1178.50

kg/ha) was recorded in the untreated Control (T_{21}). Among the treatments, seed priming with 0.5 g/l borax solution + 0.5 g/l sodium molybdate solution (T_{17}) recorded highest percent increase over Control which was 32.86%, followed by seed priming with 1 g/l, 0.5 g/l and 0.1 g/l borax solution. Least percent increase in seed yield per hectare over Control was recorded in foliar application of 50 ppm sodium molybdate (T_{15}) which was 3.38% (Fig 5).

4. DISCUSSION

Plant height is one of the main parameters representing vegetative growth. Results suggested that treatment T_{17} (T_2 + T_{10}), i.e., 11.61 cm, 29.73 cm and 39.91 cm at 30, 60 and 90 DAS showed considerably higher plant height in all the intervals than other treatments. The height of plant was greater in T_{17} treatment due to the application of extra boron and molybdenum by seed priming treatments. Similar results of increase in plant height with combined application of boron and molybdenum were reported by Nayak *et al*. (2009) and Duyingqiong *et al*. (2002). Among the seed priming treatments with varied concentration (0.1, 0.5, 1.0 g/l) of borax, maximum percent increase over control reported in treatment T_3 (seed priming with borax 1 g/l) in all intervals. Similar findings reported by Hirpara *et al*. (2017), Vishwakarma *et al*. (2008) and Geethanjali *et al*. (2015). Among different concentrations of sodium molybdate (0.25, 0.50 and 0.75 g/l) priming treatments and highest concentration treatment T_{10} (seed priming with sodium molybdate 0.50 g/l) found highest percent increase in all three intervals of 30 DAS, 60 DAS and 90 DAS as shown in Fig. 1. The results have been found similar with reported by Sharma *et al*. (2017) who recorded maximum plant height at 30, 60 and 90 DAS (8.49, 19.09 and 25.89 cm), respectively as effect of molybdenum.

It was observed that treatment T_{17} (T_2 + T_{10}) has shown the maximum number of branches per plant, i.e., 5.84, 7.41 and 9.10. Significant growth in the number of branches at all intervals was found. This might be due to the involvement of micronutrients in root and shoot elongation through cell enlargement and cell division that might have enhanced the plant growth through development of vigorous and stronger root system thereby enabling the plant to derive available soil moisture and nutrients and hence resulted in increased plant height and branches per plant. Similar results were reported by Srimathi *et al*. (2007) in green gram due to combined hardening with $MnSO_4$ (100 ppm) and Prosopis leaf extract (1.0%) + pelleting with DAP (40 g) + $MnSO_4$ (100 mg) + $FeSO_4$ (100 mg) + ammonium molybdate (250 mg/kg) of seed and Gupta and Sahu (2012) in chickpea who recorded 25.3 percent increase in grain yield due to combined application of RDF + $FeSO_4$ (10 kg/ha) + Borax (10 kg/ha) + $ZnSO_4$ (25 kg/ha) + ammonium molybdate (1 kg/ha). Sahu *et al*. (1998) also noticed comparable outcomes when treated with combined application of Zn, B and Mo. When boron applied at the rate 5 kg/ha it gave maximum plant height and number of branches per plant in peanut plant Vishwakarma *et al*. (2008).

The treatment T_{17} (T_2 + T_{10}) showed maximum number of nodules per plant at 45 DAS, 60 DAS and at time of harvest i.e., 44.66, 57.76 and 29.88. It is well known that molybdenum is involved in nitrogen fixation through nodulation (Mengel *et al*., 2002). This might be explained by the possibility that the added molybdenum boosted IAA secretion, which encouraged an increase in the number of nodules, rate of activity, and number of rhizobia in the soil (De and Chatterjee, 1976; Soundara *et al*., 1985). Additionally, increasing the number of nodules in the soil through the application of boron as borax did so because this micronutrient is crucial for cell division during the formation of nodules. In line with the present work, Soundara *et al*. (1985), Kulkami *et al*. (1989), Bhuiyan *et al*. (1997), Tripathy *et al*. (1999) and Duraisamy and Mani (2001) have reported similar results of improved nodulation of the crop due to the application of micronutrients and bio-inoculants.

The highest reduction in days to fifty percent flowering was seen by treatment T_{17} (T_2 + T_{10}) i.e., 25.57 days in comparison to all other treatments. This early flowering may have been achieved by micronutrient priming treatments applied to the seed. Kumar *et al*. (2008) also discovered comparable outcomes when priming was done using boron

Based on maturity indices in each plot for both crop seasons, the number of days needed to mature was calculated. Among the treatments, 0.5 g/l borax solution + 0.5 g/l sodium molybdate solution (T_{17}) took least number of days (111.45 days) to reach maturity, followed by seed priming with 0.50 g/l sodium molybdate solution (T_{10}) (111.70 days). Compared to seed priming treatments with varying concentrations of borax solutions, seed coating treatments, soil applications, and foliar sprays, sodium molybdate seed priming treatments matured seeds earlier. There is positive link between days to flowering, days to pod commencement, days to maturity and days to harvesting. Similar result was recorded by Gritton and Ebert (1975) in the field trials conducted on peanut cultivars of early and late maturing varieties sown at seven days intervals and concluded that the July sowings emerged faster and required less time to reach flowering and early harvesting.

The investigation on the impact of seed priming, seed coating, basal and foliar application of micronutrients on seed yield per hectare was studied. Among the treatments, seed priming with 0.5 g/l borax solution+ 0.5 g/l sodium molybdate solution (T_{17}) gave maximum seed yield of 1565.70 kg/ha, followed by seed priming with 1.0 g/l borax solution (T_3), i.e., 1537.59 kg/ha. Lowest seed yield per hectare (1178.50 kg/ha) was recorded in the untreated Control (T_{21}). The seed yield is an end product, which obviously depends upon the total dry matter production at different stages of crop growth and its partitioning into reproductive parts for higher production. Increase in the seed yield was may be due to boron application, it has the ability to increase photosynthetic and enzymatic activity in peanut plant and molybdenum involves in nitrogenase enzyme which is responsible for the nitrogen fixation process by bacteria, symbiotically with legumes crops. Treatment T_{17} (T_2 +T_{10}) results are supported by results of Duyingqiong *et al*. (2002). The increase in seed yield of groundnut as a result of boron and molybdenum application might be attributed to better crop stand and increase in plant height, number of pods per plant and test weight as a consequence of improvement in root growth and nodulation. These findings are in agreement with those reported by Singh *et al*. (1990), Sahu *et al*. (1995), Bhuiyan *et al*. (1997), Noor *et al*. (1997) and Shankhe *et al*. (2004). The increase in growth and yield of groundnut due to application of boron and molybdenum in combination might be attributed to complementary effect of these nutrients on growth and yield.

5. CONCLUSION

From the results of the present investigation, it can be concluded that seed priming with micronutrients, such as 0.5 g/l borax + 0.5 g/l sodium molybdate (T_{17}) for 6 hours and drying to original moisture content, followed by sowing was effective in improving plant growth parameters like plant height, number of branches per plant, number of nodules per plant, days to 50% flowering and days to maturity. and yield parameter like seed yield. Molybdenum treatments recorded higher plant growth parameters as compared to boron application, whereas, boron application comparatively recorded higher yield attributing parameters and seed yield over molybdenum application. In groundnut seeds, in general, seed priming treatments either with borax or sodium molybdate proved to be more effective than the seed coating treatments. Micronutrient delivery to crops through seed priming was found to be an effective method, in comparison to the conventional soil application and foliar spray.

DATA AVAILABILITY

All data generated or analysed during this study are included in this article.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

REFERENCES

Jeyaraman S. 2017. Field crops production and management. Vol. II, New Delhi: Oxford and IBH Publishing CO. PVT. Ltd.

Sahu SK. Soils of Orissa and their management. Orissa Review. 1999;19:10–13.

Singh Maha. 2008. Micronutrient Deficiencies in Crops and Soils in India. DOI: 10.1007/978-1-4020-6860-7_4.

Dixit S, Mishra PK, Muthukumar M, Reddy KM, Padhee AK and Mishra A (Eds.). 2020. Mapping the nutrient status of Odisha's soils. International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and Department of Agriculture, Government of Odisha. 342 pp.

Shukla AK, Tiwari PK and Prakash C. 2014. Micronutrients deficiencies vis-a-vis food and nutritional security of India, Indian Journal of Fertilisers, 10: 94-112.

Subba R and Adinarayana V. 1995. Molybdenum Research in Agricultural production. FDCO, New Delhi, 115-117 pp.

Arunkumar BR, Thippeshappa GN, Anjali MC and Prashanth KM. 2018. Boron: A critical micronutrient for crop growth and productivity, *Journal of Pharmacognosy and Phytochemistry*, **7**(2): 2738-41.

Veeramani P and Subrahmaniyan K. 2011. Nutrient Management for Sustainable Groundnut Productivity in India – A Review, International Journal of Engineering, Science and Technology, 3: 8138-8153.

Farooq M, Wahid A and Siddique KHM. 2012.Micronutrient application through seed treatments - a review, Journal of Soil Science and Plant Nutrition, 12(1): 125-142. http://dx.doi.org/10.4067/S0718-95162012000100011

Nayak SC, Sarangi D, Mishra GC and Rout DP. 2009. Response of groundnut to secondary and micronutrients, Journal of SAT Agricultural Research, 7: 1-2.

Duyingqiong Q, Xinrong L, Jianghua H, Zhoyao H and Xiaohong Z. 2002. Effect of B and Mo on the growth, development and yield of peanut, Plant Nutrition and Fertilizer Science, 8(2): 233-235. https://doi.org/10.9734/cjast/2020/v39i130475

Hirpara DV, Sakarvadia HL, Savaliya CM, Ranpariya VS and Modhavadiya VL. 2017. Effect of different levels of boron and molybdenum on growth and yield of summer groundnut (Arachis hypogaea L.) under medium black calcareous soils of south Saurashtra region of Gujarat, International Journal of Chemical Studies, 5(5): 1290-1293.

Vishwakarma AK, Brajendra KA, Pathak RS and Singh AL. 2008.Effect of different sources of boron application on productivity of groundnut in Mizoram, International Journal of Tropical Agriculture, 26: 157-159.

Geethanjali K, Ashoka Rani Y, Narasimha Rao KL and Madhuvani P. 2015. Effect of foliar application of ethrel and boron on morphological parameters, growth characteristics and yield in groundnut (Arachis hypogaea L.), International Journal of Food, Agriculture and Veterinary Sciences, 5(1): 120-125.

Sharma MK, Jat RA and Ganesh SS. 2017. Effect of Micronutrients and Biofertilisers on Morphophysiological Parameters and Productivity of Summer Groundnut (Arachis hypogaea L.), Indian Journal of Fertilisers, 13(3): 56-59.

Srimathi P, Kavitha S and Renugadevi J. 2007. Influence of seed hardening and pelleting on seed yield and quality in greengram {Vigna radiata (L.) Hepper} cv. CO 6,Indian Journal of Agricultural Research, 41(2): 122-126.

Gupta SC and Sahu S. 2012. Response of chickpea to micronutrients and biofertilizers in vertisol, Legume Research-An International Journal, 35(3): 248-251.

Sahu SK, Kabat B and Nayak SC. 1998. Available boron and molybdenum status of some lateritic and alluvial soils of Orissa growing groundnut and its response to molybdenum on lateritic soil, Environment Ecology, 16(4): 772–775.

Mengel K, Kirkby EA, Kosegarten H and Appel T. 2002.Principles of Plant Nutrition, Acta Physiologiae Plantarum, 24(4).

De NK and Chatterjee BN. 1976. Effect of trace elements on the growth and yield of groundnut in leached sandy loam soil, Indian Journal of Agronomy (India), 21(3): 209-216.

Soundara R, Sudhakara R and Rajr R. 1985. Nutrient uptake, pod yield relationship due to macro and micronutrients in rainfed Spanish groundnut, Madras Agricultural Journal, 71(12): 815-819.

Kulkarni JH, Sojitra VK and Bhatt DM. 1989. Effect of micronutrient application on nodulation and pod yield of groundnut (Arachis hypogaea L.), Legume Research, 12(1): 49-51.

Bhuiyan MA, Rahman MH, Khanam D and Khatun MR. 1997. Effect of micronutrients (Mo and B) and rhizobial inoculum on nodulation and yield of groundnut, Legume Research, 20(3/4): 155-159.

Tripathy SK, Patra AK and Sumai RC. 1999. Effect of micronutrients on nodulation, growth, yield and nutrient uptake of summer groundnut (A. hypogaea L.), Annals of Agricultural Research, 20(4): 439-442.

Duraisamy P and Mani AK. 2001. Effect of Iron and Molybdenum on Yield and Nutrition of groundnut, Indian Journal of Dryland Agricultural Research & Development, 16(2): 115-119.

Kumar R, Kumar SS and Pandey AC. 2008. Effect of seed soaking in nitrogen, phosphorus, potassium and boron on growth yield of garden pea (Pisum sativum L.), Ecology and Environmental Conservation Journal, 14: 383-386.

Gritton ET and Ebert RD. 1975. Interaction of planting date and powdery mildew on pea plant performance, Journal of the American Society for Horticultural Science, 100(2): 137-142.

Singh AL, Joshi TC, Koradia VG, Sinha SK, Sane PV, Bhargava SC and Agarwal PK. 1990. Effect of micronutrients and sulphur on groundnut (Arachis hypogaea L.) in calcareous soil, Proceedings of the international congress of plant physiology, New Delhi, India, 2: 1236-1240.

Sahu SK, Dhal JK and Das BB. 1995. Response of groundnut to boron with and without molybdenum and lime in lateritic soils in Orissa, International Arachis NewsLetter, 15: 79-80.

Noor S, Hannan MA and Islam MS. 1997. Effect of molybdenum and boron on the growth and yield of groundnut, Indian Journal of Agricultural Research, 31(1): 51- 58.

Shankhe GM, Naphade PS, Ravankar HN, Sarap PA and Hadole SS. 2004. Effect of boron and molybdenum on their uptake and yield of groundnut, Agricultural Science Digest, 24(11): 51-53.

Table 1. Effect of seed priming and coating with borax and sodium molybdate on plant height at 30, 60 and 90 DAS

Treatments	Plant height (cm)								
	30 DAS			60 DAS			90 DAS		
	2018-19	2019-20	Pooled	2018-19	2019-20	Pooled	2018-19	2019-20	Pooled
T_1 : Priming with borax 0.1 g/l	10.27	9.74	10.00	26.33	25.89	26.11	37.97	37.87	37.92
T_2 : Priming with borax 0.5 g/l	10.37	9.85	10.11	26.46	26.01	26.23	38.07	37.98	38.03
T_3 : Priming with borax 1.0 g/l	10.48	9.95	10.22	26.52	26.07	26.30	38.34	38.24	38.29
T_4 : Coating with borax 100 mg/kg seed	9.15	8.63	8.89	25.22	24.77	24.99	35.25	35.15	35.20
T_5 : Coating with borax 200 mg/kg seed	9.02	8.49	8.76	25.54	25.10	25.32	34.96	34.87	34.92
T_6 : Coating with borax 300 mg/kg seed	8.99	8.46	8.72	25.04	24.60	24.82	34.88	34.78	34.83
T_7 : Two foliar sprays of borax 100 ppm	10.12	9.59	9.85	26.29	25.85	26.07	36.29	36.20	36.25
T_8 : Soil application of borax 10 kg/ha	8.44	7.86	8.15	24.12	23.68	23.90	33.93	33.84	33.89
T_9 : Priming with SM 0.25 g/l	10.87	10.35	10.61	27.48	27.04	27.26	39.61	39.52	39.57
T_{10} : Priming with SM 0.50 g/l	10.96	10.44	10.70	27.85	27.41	27.63	39.93	39.84	39.88
T_{11} : Priming with SM 0.75 g/l	10.90	10.38	10.64	27.78	27.33	27.55	39.83	39.73	39.78
T_{12} : Coating with SM 2 g/kg seed	9.34	8.81	9.08	25.63	25.18	25.41	35.63	35.54	35.58
T_{13} : Coating with SM 4 g/kg seed	9.28	8.75	9.01	25.44	25.00	25.22	35.44	35.35	35.40
T_{14} : Coating with SM 6 g/kg seed	9.23	8.70	8.97	25.36	24.92	25.14	35.36	35.27	35.32
T_{15} : Two foliar sprays of SM 50 ppm	10.54	10.01	10.27	26.79	26.35	26.57	38.52	38.42	38.47
T_{16} : Soil application of SM 1.5 kg/ha	8.52	8.00	8.26	24.42	23.98	24.20	34.42	34.33	34.38
T_{17} : T_2 + T_{10}	11.87	11.34	11.61	29.96	29.51	29.73	39.96	39.86	39.91
T_{18} : T_5 + T_{13}	9.93	9.40	9.67	25.98	25.53	25.75	35.98	35.88	35.93
T_{19} : T_7 + T_{15}	10.65	10.12	10.38	26.94	26.49	26.72	38.85	38.76	38.81
T_{20} : T_8 + T_{16}	8.74	8.21	8.48	24.96	24.52	24.74	34.57	34.47	34.52
T_{21} : CONTROL	8.20	7.60	7.90	21.66	21.22	21.44	31.66	31.57	31.61
Mean	9.80	9.27	9.54	25.99	25.54	25.77	36.64	36.55	36.59
S.E.m(±)	0.265	0.265	0.168	0.620	0.622	0.393	0.885	0.885	0.560
$CD_{0.05}$	0.757	0.758	0.470	1.772	1.777	1.102	2.531	2.529	1.571

Table 2. Effect of seed priming and coating with borax and sodium molybdate on number of branches per plant at 30, 60 and 90 DAS

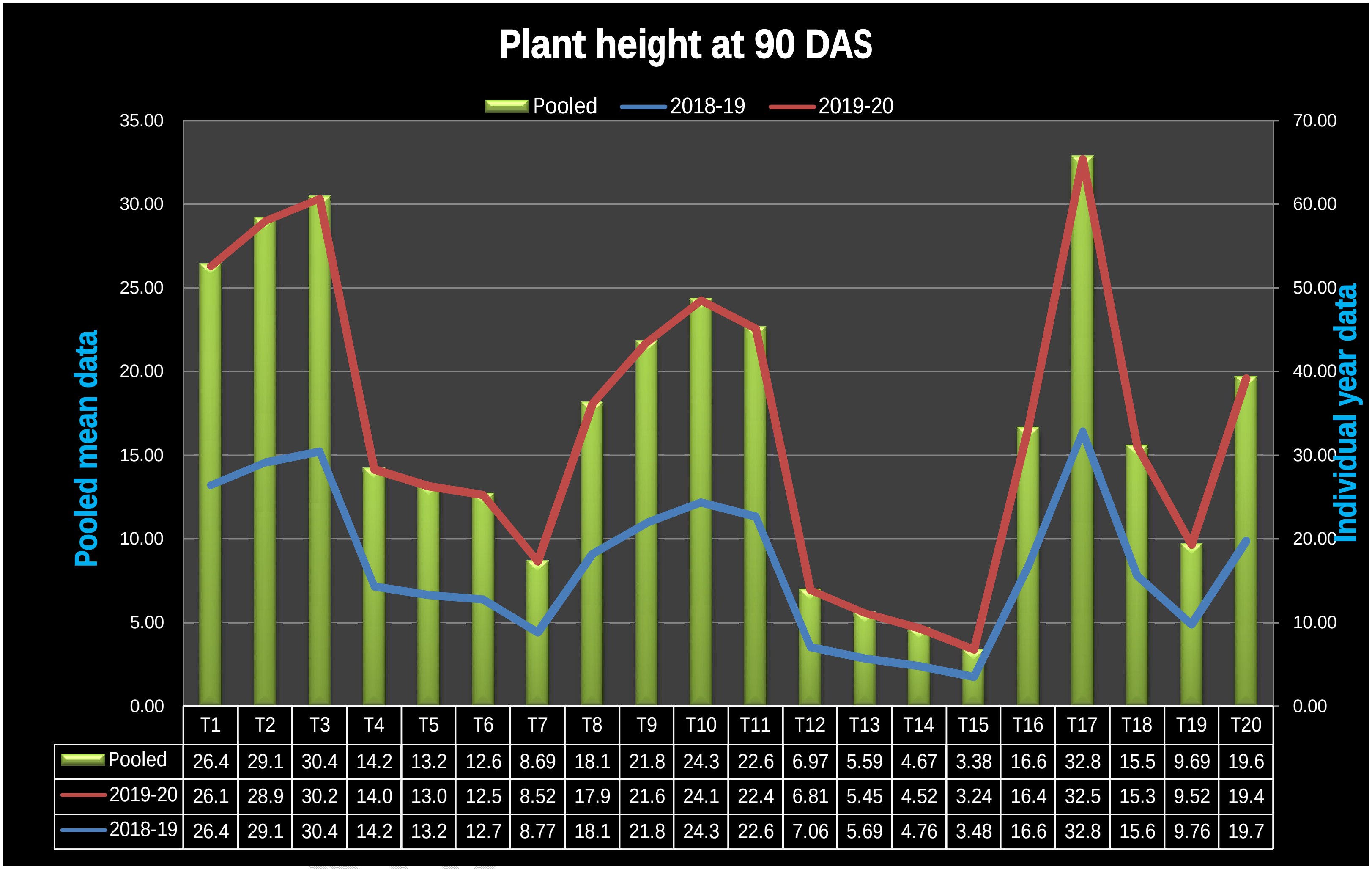
Treatments	Number of branches per plant								
	30 DAS			60 DAS			90 DAS		
	2018-19	2019-20	Pooled	2018-19	2019-20	Pooled	2018-19	2019-20	Pooled
T_1 : Priming with borax 0.1 g/l	5.34	5.27	5.30	6.92	6.84	6.88	8.60	8.52	8.56
T_2 : Priming with borax 0.5 g/l	5.37	5.29	5.33	6.94	6.84	6.89	8.63	8.54	8.58
T_3 : Priming with borax 1.0 g/l	5.44	5.37	5.40	7.01	6.93	6.97	8.70	8.62	8.66
T_4 : Coating with borax 100 mg/kg seed	4.96	4.88	4.92	6.53	6.45	6.49	8.22	8.13	8.17
T_5 : Coating with borax 200 mg/kg seed	4.92	4.85	4.89	6.49	6.41	6.45	8.18	8.10	8.14
T_6 : Coating with borax 300 mg/kg seed	4.87	4.79	4.83	6.44	6.36	6.40	8.12	8.04	8.08
T_7 : Two foliar sprays of borax 100 ppm	5.22	5.14	5.18	6.79	6.71	6.75	8.47	8.39	8.43
T_8 : Soil application of borax 10 kg/ha	4.75	4.68	4.72	6.32	6.24	6.28	8.01	7.93	7.97
T_9 : Priming with SM 0.25 g/l	5.56	5.49	5.52	7.13	7.05	7.09	8.82	8.74	8.78
T_{10} : Priming with SM 0.50 g/l	5.65	5.58	5.61	7.22	7.14	7.18	8.91	8.83	8.87
T_{11} : Priming with SM 0.75 g/l	5.62	5.55	5.58	7.19	7.11	7.15	8.88	8.80	8.84
T_{12} : Coating with SM 2 g/kg seed	5.14	5.06	5.10	6.71	6.63	6.67	8.39	8.31	8.35
T_{13} : Coating with SM 4 g/kg seed	5.10	5.02	5.06	6.67	6.59	6.63	8.35	8.27	8.31
T_{14} : Coating with SM 6 g/kg seed	5.03	4.96	5.00	6.60	6.52	6.56	8.29	8.21	8.25
T_{15} : Two foliar sprays of SM 50 ppm	5.49	5.42	5.46	7.06	6.98	7.02	8.75	8.67	8.71
T_{16} : Soil application of SM 1.5 kg/ha	4.76	4.68	4.72	6.33	6.25	6.29	8.01	7.93	7.97
T_{17} : T_2 + T_{10}	5.88	5.81	5.84	7.45	7.37	7.41	9.14	9.06	9.10
T_{18} : T_5 + T_{13}	5.20	5.13	5.17	6.77	6.69	6.73	8.46	8.38	8.42
T_{19} : T_7 + T_{15}	5.55	5.47	5.51	7.12	7.03	7.07	8.80	8.72	8.76
T_{20} : T_8 + T_{16}	4.81	4.74	4.78	6.38	6.30	6.34	8.07	7.99	8.03
T_{21} : CONTROL	4.31	4.24	4.28	5.88	5.80	5.84	7.57	7.49	7.53
Mean	5.19	5.11	5.15	6.76	6.68	6.72	8.45	8.36	8.41
S.E.m(±)	0.129	0.173	0.097	0.173	0.194	0.116	0.222	0.222	0.140
$CD_{0.05}$	0.370	0.494	0.271	0.494	0.555	0.326	0.633	0.634	0.393

Table 3. Effect of seed priming and coating with borax and sodium molybdate on number of nodules per plant at 45, 60 DAS and at harvest time

Treatments	Number of nodules per plant								
	45 DAS			60 DAS			Harvest		
	2018-19	2019-20	Pooled	2018-19	2019-20	Pooled	2018-19	2019-20	Pooled
T_1 : Priming with borax 0.1 g/l	34.435	33.875	34.15	47.521	46.981	47.25	24.430	23.907	24.17
T_2 : Priming with borax 0.5 g/l	35.003	34.443	34.72	48.090	47.550	47.82	24.897	24.373	24.64
T_3 : Priming with borax 1.0 g/l	36.643	36.083	36.36	49.729	49.189	49.46	25.710	25.187	25.45
T_4 : Coating with borax 100 mg/kg seed	30.320	29.760	30.04	43.407	42.867	43.14	20.277	19.753	20.02
T_5 : Coating with borax 200 mg/kg seed	30.048	29.488	29.77	43.135	42.595	42.87	19.519	18.996	19.26
T_6 : Coating with borax 300 mg/kg seed	29.920	29.360	29.64	43.007	42.467	42.74	18.901	18.377	18.64
T_7 : Two foliar sprays of borax 100 ppm	34.323	33.763	34.04	47.410	46.870	47.14	24.052	23.528	23.79
T_8 : Soil application of borax 10 kg/ha	25.638	25.078	25.36	38.724	38.184	38.45	16.584	16.060	16.32
T_9 : Priming with SM 0.25 g/l	41.991	41.431	41.71	55.077	54.537	54.81	28.024	27.501	27.76
T_{10} : Priming with SM 0.50 g/l	42.768	42.208	42.49	55.854	55.314	55.58	28.560	28.037	28.30
T_{11} : Priming with SM 0.75 g/l	42.720	42.160	42.44	55.807	55.267	55.54	28.110	27.587	27.85
T_{12} : Coating with SM 2 g/kg seed	30.611	30.051	30.33	43.698	43.158	43.43	21.958	21.435	21.70
T_{13} : Coating with SM 4 g/kg seed	30.479	29.919	30.20	43.566	43.026	43.30	21.643	21.120	21.38
T_{14} : Coating with SM 6 g/kg seed	30.390	29.830	30.11	43.476	42.936	43.21	21.598	21.075	21.34
T_{15} : Two foliar sprays of SM 50 ppm	37.575	37.015	37.29	50.662	50.122	50.39	26.167	25.644	25.91
T_{16} : Soil application of SM 1.5 kg/ha	25.978	25.418	25.70	39.065	38.525	38.79	16.771	16.247	16.51
T_{17} : T_2 + T_{10}	44.937	44.377	44.66	58.030	57.483	57.76	30.144	29.621	29.88
T_{18} : T_5 + T_{13}	32.795	32.235	32.51	45.881	45.341	45.61	23.180	22.656	22.92
T_{19} : T_7 + T_{15}	37.660	37.100	37.38	50.747	50.207	50.48	26.380	25.856	26.12
T_{20} : T_8 + T_{16}	26.535	25.975	26.26	39.622	39.082	39.35	16.868	16.345	16.61
T_{21} : CONTROL	23.664	23.104	23.38	36.751	36.211	36.48	13.804	13.281	13.54
Mean	33.544	32.984	33.26	46.631	46.091	46.36	22.742	22.218	22.48
S.E.m(±)	1.162	1.162	0.735	1.172	1.162	0.738	0.699	0.699	0.442
$CD_{0.05}$	3.323	3.323	2.063	3.350	3.323	2.071	1.998	1.998	1.241

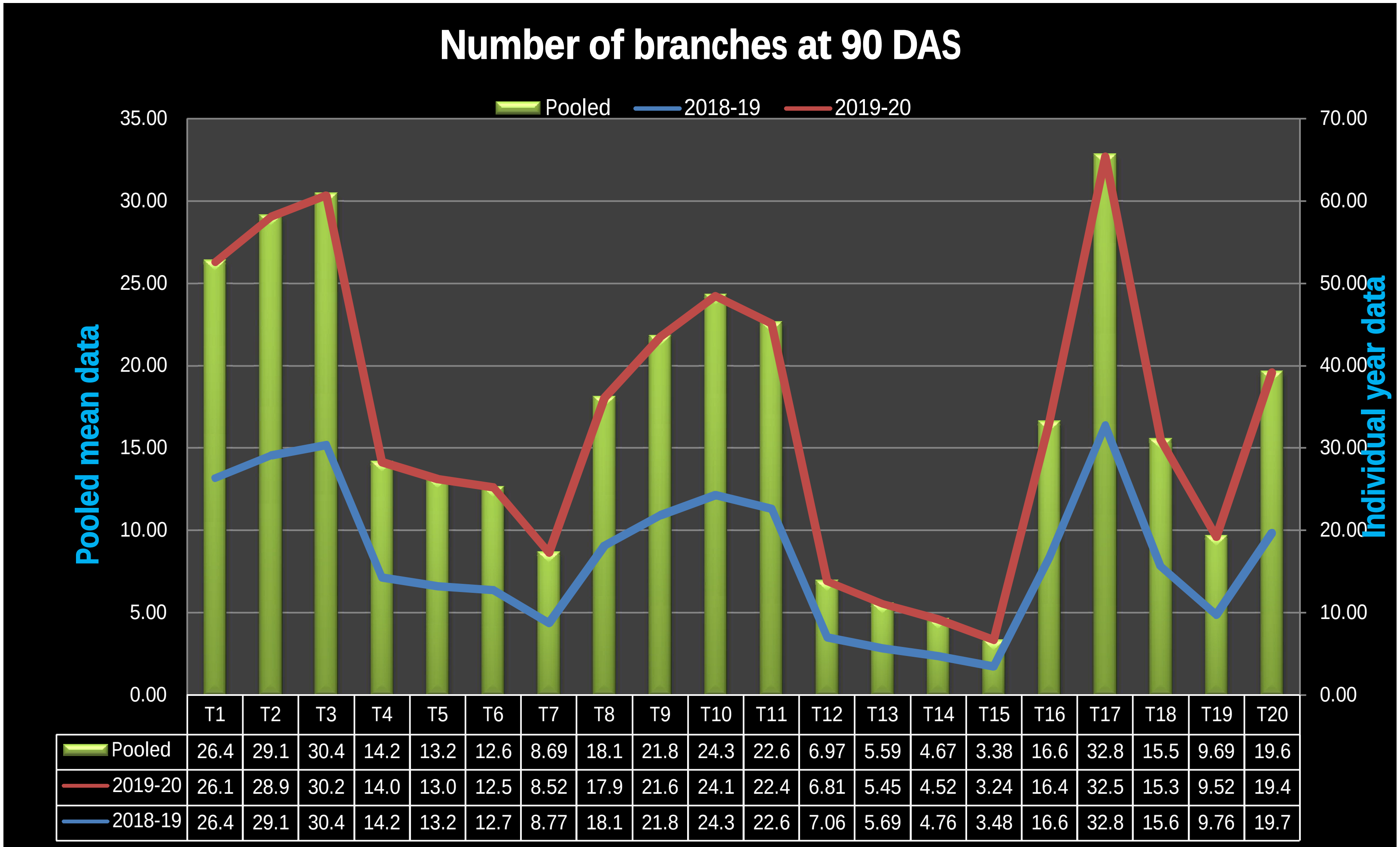
Table 4. Effect of seed priming and coating with borax and sodium molybdate on Days to 50% flowering, days to maturity and seed yield

Treatments	Days to 50% flowering			Days to maturity			Seed yield (kg ha^{-1})		
	2018-19	2019-20	Pooled	2018-19	2019-20	Pooled	2018-19	2019-20	Pooled
T_1 : Priming with borax 0.1 g/l	26.85	26.77	26.81	112.68	112.72	112.70	1497.21	1482.68	1489.95
T_2 : Priming with borax 0.5 g/l	26.68	26.60	26.64	112.53	112.56	112.55	1529.42	1514.89	1522.15
T_3 : Priming with borax 1.0 g/l	26.56	26.47	26.51	112.41	112.45	112.43	1544.86	1530.33	1537.59
T_4 : Coating with borax 100 mg/kg seed	28.26	28.17	28.21	114.08	114.11	114.09	1353.38	1338.85	1346.12
T_5 : Coating with borax 200 mg/kg seed	28.51	28.42	28.46	114.41	114.45	114.43	1341.36	1326.83	1334.10
T_6 : Coating with borax 300 mg/kg seed	28.88	28.80	28.84	114.74	114.78	114.76	1335.24	1320.71	1327.97
T_7 : Two foliar sprays of borax 100 ppm	27.30	27.22	27.26	112.75	112.79	112.77	1288.16	1273.63	1280.89
T_8 : Soil application of borax 10 kg/ha	30.91	30.83	30.87	115.20	115.23	115.22	1399.73	1385.20	1392.46
T_9 : Priming with SM 0.25 g/l	25.98	25.90	25.94	111.80	111.84	111.82	1443.08	1428.55	1435.82
T_{10} : Priming with SM 0.50 g/l	25.86	25.78	25.82	111.68	111.72	111.70	1472.70	1458.17	1465.44
T_{11} : Priming with SM 0.75 g/l	25.96	25.87	25.91	111.78	111.81	111.80	1452.92	1438.39	1445.65
T_{12} : Coating with SM 2 g/kg seed	27.88	27.80	27.84	113.33	113.37	113.35	1267.90	1253.37	1260.64
T_{13} : Coating with SM 4 g/kg seed	27.98	27.90	27.94	113.43	113.47	113.45	1251.69	1237.16	1244.43
T_{14} : Coating with SM 6 g/kg seed	28.01	27.92	27.97	113.84	113.87	113.85	1240.74	1226.21	1233.48
T_{15} : Two foliar sprays of SM 50 ppm	26.50	26.41	26.45	112.31	112.35	112.33	1225.59	1211.06	1218.32
T_{16} : Soil application of SM 1.5 kg/ha	30.70	30.62	30.66	115.38	115.41	115.39	1381.95	1367.42	1374.69
T_{17} : T_2 + T_{10}	25.61	25.53	25.57	111.43	111.46	111.45	1572.96	1558.43	1565.70
T_{18} : T_5 + T_{13}	27.63	27.55	27.59	113.08	113.12	113.10	1369.33	1354.80	1362.06
T_{19} : T_7 + T_{15}	26.20	26.11	26.15	112.02	112.05	112.03	1299.95	1285.42	1292.68
T_{20} : T_8 + T_{16}	29.09	29.01	29.05	114.93	114.96	114.94	1417.73	1403.20	1410.46
T_{21} : CONTROL	33.43	33.35	33.39	116.11	116.15	116.13	1184.33	1172.67	1178.50
Mean	27.85	27.76	27.80	113.33	113.36	113.35	1374.77	1360.38	1367.58
S.E.m(±)	0.670	0.361	0.340	2.743	2.743	1.735	60.039	59.892	37.926
$CD_{0.05}$	1.914	1.032	0.955	NS	NS	NS	171.604	171.186	106.411



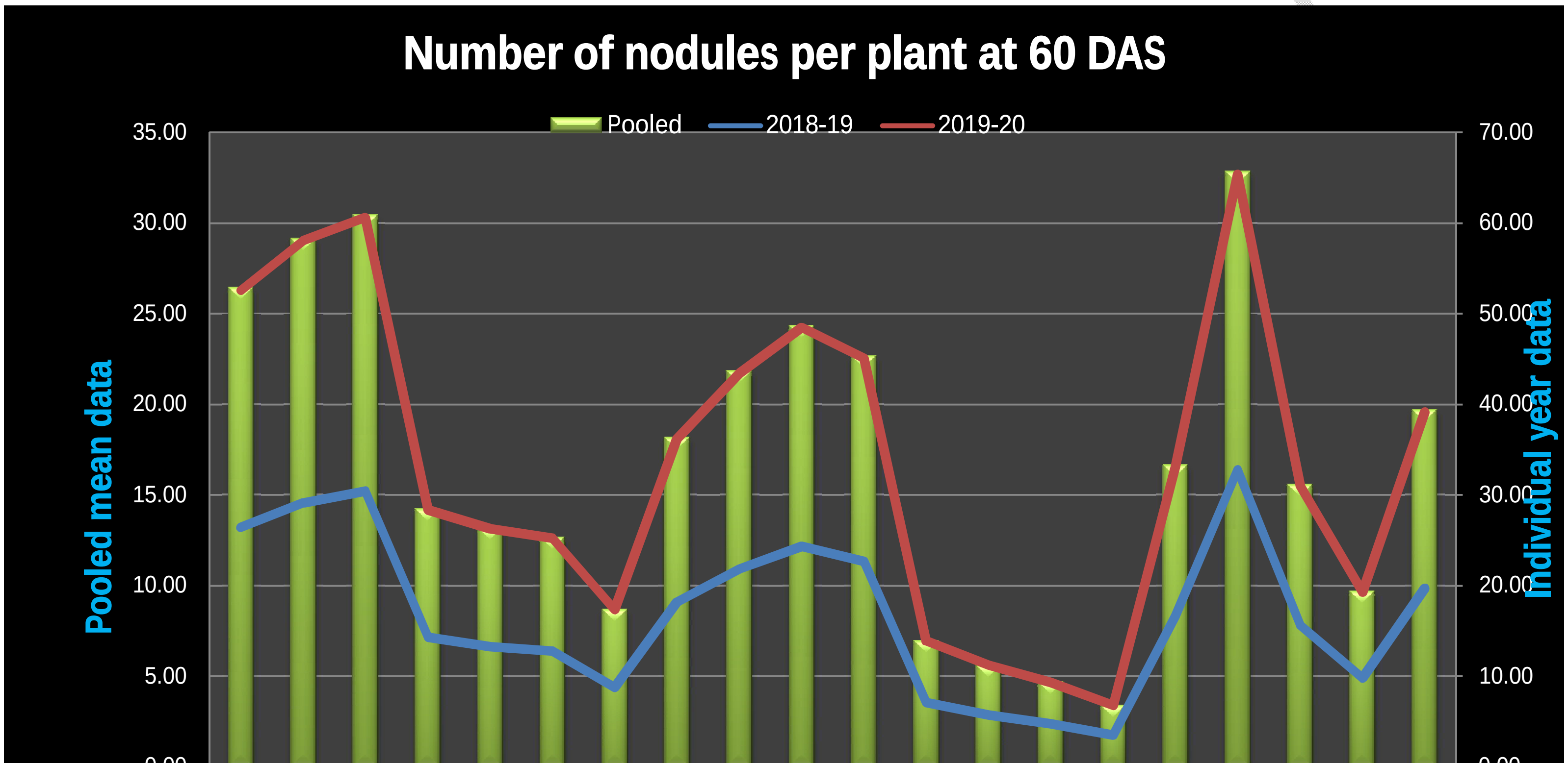
	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20
Pooled	26.4	29.1	30.4	14.2	13.2	12.6	8.69	18.1	21.8	24.3	22.6	6.97	5.59	4.67	3.38	16.6	32.8	15.5	9.69	19.6
2019-20	26.1	28.9	30.2	14.0	13.0	12.5	8.52	17.9	21.6	24.1	22.4	6.81	5.45	4.52	3.24	16.4	32.5	15.3	9.52	19.4
2018-19	26.4	29.1	30.4	14.2	13.2	12.7	8.77	18.1	21.8	24.3	22.6	7.06	5.69	4.76	3.48	16.6	32.8	15.6	9.76	19.7

Fig 1. Percent increase in plant height over Control at 90 DAS as influenced by priming and coating of groundnut seeds with borax and sodium molybdate



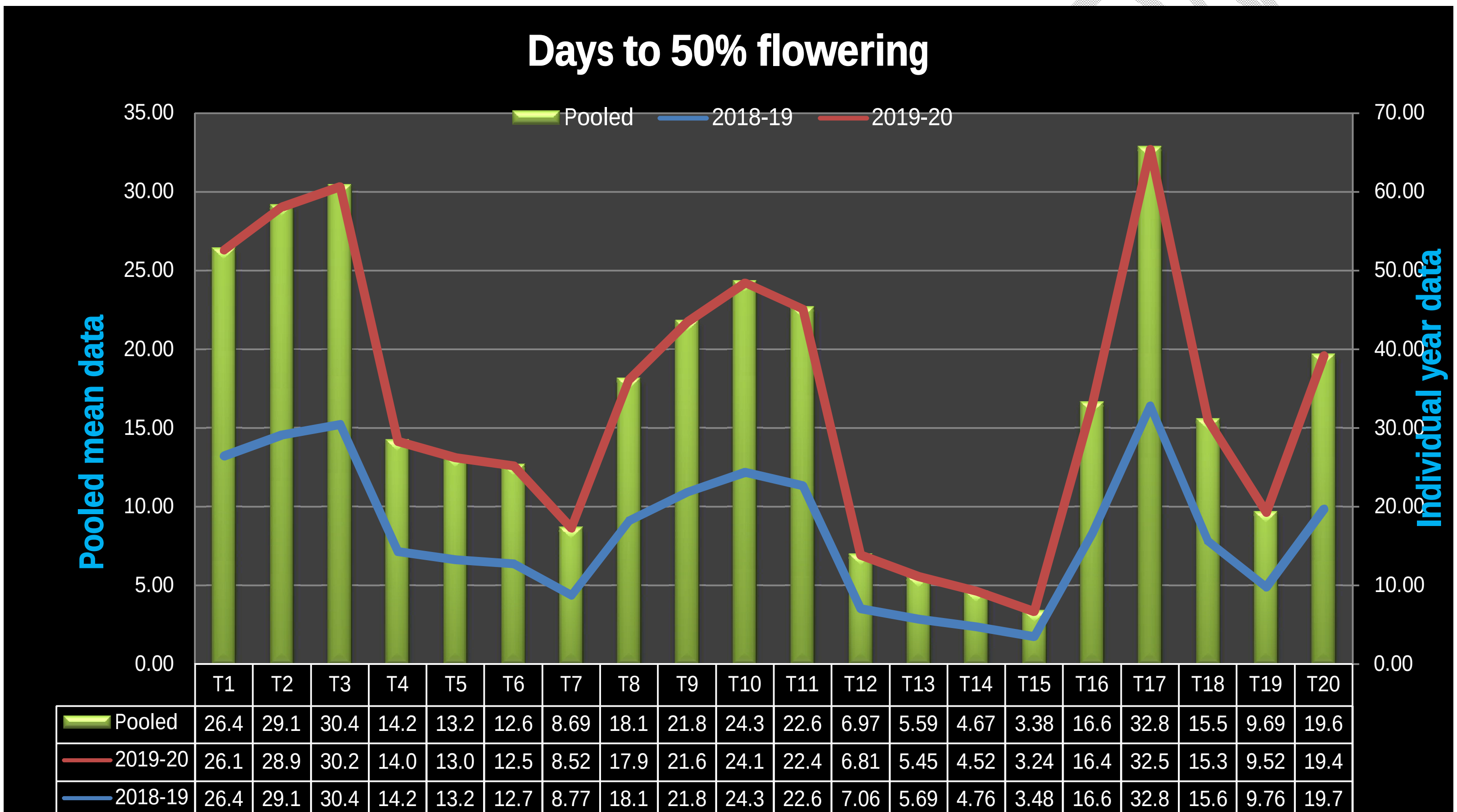
	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20
Pooled	26.4	29.1	30.4	14.2	13.2	12.6	8.69	18.1	21.8	24.3	22.6	6.97	5.59	4.67	3.38	16.6	32.8	15.5	9.69	19.6
2019-20	26.1	28.9	30.2	14.0	13.0	12.5	8.52	17.9	21.6	24.1	22.4	6.81	5.45	4.52	3.24	16.4	32.5	15.3	9.52	19.4
2018-19	26.4	29.1	30.4	14.2	13.2	12.7	8.77	18.1	21.8	24.3	22.6	7.06	5.69	4.76	3.48	16.6	32.8	15.6	9.76	19.7

Fig 2. Percent increase in number of branches per plant over Control at 90 DAS as influenced by priming and coating of groundnut seeds with borax and sodium molybdate



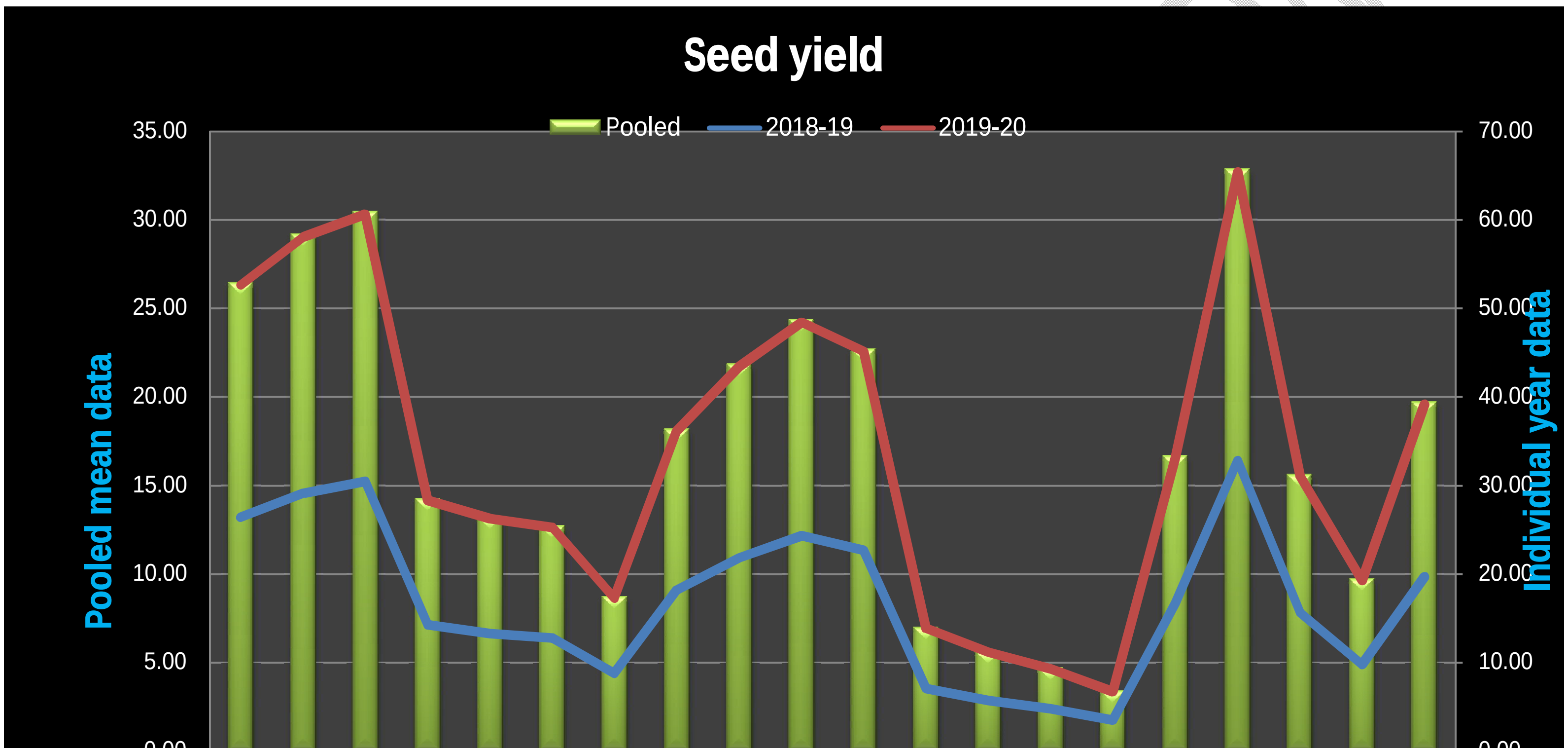
	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20
Pooled	26.4	29.1	30.4	14.2	13.2	12.6	8.69	18.1	21.8	24.3	22.6	6.97	5.59	4.67	3.38	16.6	32.8	15.5	9.69	19.6
2019-20	26.1	28.9	30.2	14.0	13.0	12.5	8.52	17.9	21.6	24.1	22.4	6.81	5.45	4.52	3.24	16.4	32.5	15.3	9.52	19.4
2018-19	26.4	29.1	30.4	14.2	13.2	12.7	8.77	18.1	21.8	24.3	22.6	7.06	5.69	4.76	3.48	16.6	32.8	15.6	9.76	19.7

Fig 3. Percent increase in number of nodules per plant over Control at 60 DAS as influenced by priming and coating of groundnut seeds with borax and sodium molybdate



	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20
Pooled	26.4	29.1	30.4	14.2	13.2	12.6	8.69	18.1	21.8	24.3	22.6	6.97	5.59	4.67	3.38	16.6	32.8	15.5	9.69	19.6
2019-20	26.1	28.9	30.2	14.0	13.0	12.5	8.52	17.9	21.6	24.1	22.4	6.81	5.45	4.52	3.24	16.4	32.5	15.3	9.52	19.4
2018-19	26.4	29.1	30.4	14.2	13.2	12.7	8.77	18.1	21.8	24.3	22.6	7.06	5.69	4.76	3.48	16.6	32.8	15.6	9.76	19.7

Fig 4. Percent decrease in days to flowering initiation in 50% plants (B) over Control as influenced by priming and coating of groundnut seeds with borax and sodium molybdate.



	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20
Pooled	26.4	29.1	30.4	14.2	13.2	12.6	8.69	18.1	21.8	24.3	22.6	6.97	5.59	4.67	3.38	16.6	32.8	15.5	9.69	19.6
2019-20	26.1	28.9	30.2	14.0	13.0	12.5	8.52	17.9	21.6	24.1	22.4	6.81	5.45	4.52	3.24	16.4	32.5	15.3	9.52	19.4
2018-19	26.4	29.1	30.4	14.2	13.2	12.7	8.77	18.1	21.8	24.3	22.6	7.06	5.69	4.76	3.48	16.6	32.8	15.6	9.76	19.7

Fig 5. Percent increase in seed yield per hectare over Control as influenced by priming and coating of groundnut seeds with borax and sodium molybdate.