physiological studies on nitrogen nutrition of soybean plant (glycine max.l.merr)

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The present investigation was carried out to detect the influence of different levels of nitrogen supplyeither alone or in combinations with Rb.iz~biUln J.~o~=- -cum, micronutrients or phosphorus on plant gr(H'lth, seed yield and it s component s as well as chemical coupe sit ion of different soybean plant parts throughout its growth cycle. .Also the use a f chemical analysis of the varioussoybean plant parts as a tool in detennining nitrogen requirements of soybean plant and the relationship between nitrogen content of certain parts of the plant and seed yield. 'rherefore, three field trial s were conducted at Bahtim Agricultural Experimental Station, AgriculturalResearch Center using Calland soybean variety in season 1980. The design of the exp ezdmerrt a were complete randomized bla ck with three replications. liitrogen levels in the first and second experiments were 0, 15, JO. 45. 60, 75 and 90 kg !'II fed. ccubdned vlith Rhizobium ~aponicumin the fonner and micronutrients in the later (Fe + zn + !lJ.n+ 'eu + B + :Mo) • Micronutrients were applied by soaking seeds in complete micronutrients solution and sprayed towice with the same solution. Furthenno re, a cant rol treatm.ent was added in both experiments for complete comparison. In the third experiment phosphorus fertilizer at three rates' (0, 15 and 30 kg P2°5' fed.) were combined with 6 n1.trogen levels a, e. O. 15, 30. 45, 60 and 15 kg :HIred. The main trend of results can be summariz.edas follows: 1- Numberof nodules/ plant sharply increased from fl owering to mid pod filling st age (from 44 t 111 75 days after planting).2- :nitrogen fertilizer at the low level i. e. 15 kg / fed. increased number of nodules/ plant. whereas, such number Vias decreased with increasing nitrogen rates. 3- The height of soybean plant increased gradually with advancing age till maturity. The grand period of stem elongation occurred during the period from floweringtill pod formation ·stege. 4- ~lizo£!~1~~~ siGnificantly increased soybean plant height. Nitrogen dressing had no significant effect on plant height under inoculation conditions. 5- The application of micronutrients either alone or with nitrogen fertilizer had no significant effect upon soybean plant height. 6- Applying 60 kg Iii fed. increased soybean plant height significantly. The addition of phosphorus either alone or in combination with nitrogen fertilizer did not show S1JY sienifican;t response, except the rate of 15 kgP20S/ fed. with 75 kg HI fed. which significantly inere&- sed soybean plant height than those obtained by the same- - level of nitrogen alone. 7- Leaf-production by soybean pl ant inoreasedgradua1.l.yto pod fonnation stage, then decreased after that. The grand period of leaf-product ion occurred during the period from flowering till pod fonnation. a- .lfumberof les.vesl plant was not affected by rhizobia, micronutrients and phosphorus additions either alone or in conjunction with different levels of nitrogen fertilizer. However, micronutr1ents and phosphorus seemed to advance the grand period of leaf-production to floweringt:ime. 9- The product ion of leaves in soybean plant was enhanced by moderate level of nitrogen fertilizer alone(45 kg I fed.) especially at pod fo:tlIlat1onstage. 10- Dry matter accumulation in root, leaf-petiolesand leaf-blades started with low rate at flowering, increased rapidly after that till pod format1on stage , then decllned at maturity. II-Dry matter production in stem as well as theentire plant increased by time to reach the highest value nearly at green bean stage. Ho_ver, dry matter accumulation in the reproductive organs 1.e. perlcarpes and seeds increased trom green beau stage till maturity.12- Leaf'- blade was found to be the main soybean plant dry matter component at fiower1ng, wbil.e stem comprises the highest proportion of' dry matter at both pod f011llation and green bean stages. At maturity, seed

was the main domenant organ in the whole 897bean plant. 13- The application of Rhizobium i1!20nioumalone or with -high levels of nitrogen fertilizer i.e. 75 or90 kg I fed. significantlJ' increased the dry matter accumula.tion in stem, pericarpes, .seeds, as well as theentire plant coupared with control and rhizobia t reatLUents.