

ALTON MILLETT PORTER



122
167
THS

THESIS

THE INFLUENCE OF SODIUM CHLORIDE AND
SODIUM NITRATE ON ASPARAGUS PRODUCTION

ALTON M. PORTER. WM. VANBUSKIRK.
J. FREEMAN SHELDON

1917

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THE MINISTRY OF DEFENSE OF GERMANY AND
CONTINUITY OF ARMS SUPPLY TO RUSSIA

Part II.

FORBES, EMMETT, JR., 2, 17, 22, 24, 25

HIGH AND LOW LENGTH OR WEIGHT ...

PLACING IT IN WATER IN THE COLD STORAGE.

Submitted by

Alton M. ~~Went~~er, William VanBuskirk
and ~~James~~ ~~Went~~er, Sec.

The above information was obtained from
 the San Antonio Herald (GPO) on
 June, 1967.

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THE INFLUENCE OF SOILS ON THE GROWTH AND YIELD OF ASPER- GUS IN THE MAIN GROWING REGION.

Most of the experimental work on fertilization of asper-
gus has been handled in a general way, but very little material
is available on the effect of any particular fertilizer. There-
fore in this work we limit the fertilizers to salt and nitrate
of soda respectively. Taking these two as a basis discussion has
been in their effect upon asparagus production, and also because
there seems to be a variety of opinions as to their value as
fertilizers.

The application of common salt (Sodium chloride) has been
practiced for many years and looked upon as a necessary to the
growth of asparagus. The reason for this is no doubt due to
the fact that the plant is a maritime species and that the wild
asparagus plant is a native of Southern Europe and grew most
vigorous along streams and sea shores.

In addition to this it was found by chemical analysis that
the average contained considerable amounts of sodium. This gave
the inference that the plant must require salt so first it was
used for its direct fertilizing action, but later we have looked
upon as an indirect fertilizer. However, a plant may take up
relative large quantities of chemical substance from the soil
and at the same time it may not be necessary for
the plants growth or of any particular value.



THE INFLUENCE OF SODIUM CHLORIDE AND SODIUM NITRATE ON ASPARAGUS PLANTATION.

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In addition to this it was found by chemical analysis that the average contained considerable amount of sodium. This gave the inference that the plant must require salt so first it was used for its direct fertilizing action, but later became looked upon as an indirect fertilizer. However, a plant may take up relative large quantities of chemical substance from the soil and at the same time it may not have what is necessary for the plants growth or of any particular value.

II. INTRODUCTION

OF SCIENCE OF SPRING AND SUMMER PLANTS

OF ASPHALAGUS PLANTATION.

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In addition to this it was found by chemical analysis that the plants contained considerable amounts of sodium. This gave the inference that the plant must require salt so first it was used for its direct fertilizing action, but later became looked upon as an indirect fertilizer. However, a plant may take up relative large quantities of chemical substance from the soil and at the same time be more or less indifferent necessary for the plants growth or of any particular value.



THE INFLUENCE OF SOIL, CLIMATE AND CULTIVATION ON ASPERGILLUS PRODUCTION.

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In addition to this it was found by chemical analysis that the ferns contain considerable amount of sodium. This gave the inference that the plant must require salt so first it was used for its direct fertilizing action, but later we have looked upon as an indirect fertilizer. However, a plant may take up relative large quantities of chemical substance from the soil and still the same may be worthless and not be necessary for the plants growth or of any particular value.



THE INFLUENCE OF SOIL, CLIMATE AND CULTIVATION ON ASPARAGUS PRODUCTION.

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In addition to this it was found by chemical analysis that the average contained considerable amounts of sodium. This gave the inference that the plant must require salt so first it was used for its direct fertilizing action, but later on we looked upon as an indirect fertilizer. However, a plant may take up relative large quantities of chemical substance from the soil and it the soil may then contain substances that are necessary for the plants growth or of any particular value.



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II. INFLUENCE

OF SEWAGE EFFLUENT AND SEWAGE SLUDGE ON ASPERAGUS MARITIMUS.

Most of the experimental work on fertilization of asparagus has been handled in a general way, but very little material is available on the effect of any particular fertilizer. Therefore in this work we limit the fertilizers to salt and nitrate of soda respectively. Taking these two as a basis discussion has been on their effect upon asparagus production, and also because there seems to be a variety of opinions as to their value as fertilizers.

The application of common salt (Sodium chloride) has been practiced for many years and looked upon as a necessary to the growth of asparagus. The reason for this is no doubt due to the fact that the plant is a maritime species and that the wild asparagus plant is a native of Southern Europe and grew most vigorous along streams and sea shores.

In relation to this it was found by chemical analysis that the average contains considerable amount of sodium. This gave the inference that the plant must require salt so first it was used for its direct fertilizing action, but later became looked upon as an indirect fertilizer. However, a plant may take up relative large quantities of chemical substance from the soil and at the same time these substances are not necessary for the plants growth or of any particular value.

The method in which the salt should be applied varies with climate and soil conditions. It is in general applied broadcast or at intervals during the growing period. Which system is the best has not been successfully shown. The Arkansas Experiment Station in a publication on the subject attributes the increase of yield of the cotton to the fact that it keeps weeds down. It also claims that it supplies certain values from sodium, but the Dorr and Experiment Station states in published results of an experiment that sodium in a form chloride has influenced growth of certain plants by its effect upon the electric reaction of the soil, but had little or no action as a fertilizer.

Nitrate of soda is included in several fertilizer formulas for asparagus, but little has been done with nitrate of soda as a lone fertilizer in connection with huckle. Whether it should be put on in a single application or at different intervals through the season has not been determined. This was worked on by the Dorr Experiment Station, and the result was that they do not recommend the application of fertilizer during the growing season, however, the nitrate of soda was put on in a single application. So we have to yet add more results and facts in regard to the number of applications and benefit of the fertilizer.

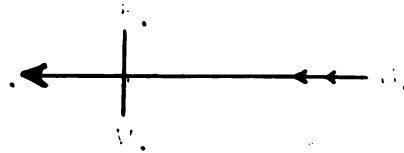
The experimental field was of a sandy loam and it was heavily manured. It being a very wet season, work on the experiment did not begin till late in April. On April 18th, the field was measured and the plans for carrying on the experiment were decided upon. The field was divided up into eight plots, and salt and nitrate of soda were used as experimental fertilizers. In using these two fertilizers we desired to find by different methods of applying, which was the most profitable fertilizer to apply and the method by which it should be applied to make it the most profitable for the asparagus growing. On April 27th, we fertilized the plots by sprinkling the fertilizer on broadcast.

On plot number one we put salt on at the rate of 1000 pounds per acre.

On plot number two we put nitrate of soda on at the rate of 350 pounds per acre, and instead of putting it on all at one application, we put it on at the rate of 62½ pounds per week for four weeks.

For check plots for plot number one and plot number two were west of their respective plots and were of equal dimensions.

DIAGRAM OF THE FIELD AND PLOTS.



ONE FULL PLOT OF PLOT NUMBER ONE	PLOT NUMBER ONE. SAME 1000 LBS. PER ACRE ALL AT ONE APPLICATION.
PLOT NUMBER TWO SAME 1000 LBS. PER ACRE OF FOUR APPLICATIONS ONE MONTH APART	CUTTING PLOT OF PLOT NUMBER TWO.
CUTTING PLOT OF PLOT NUMBER FOUR	PLOT NUMBER TWO RATE OF 1000 LBS. PER ACRE AT FOUR APPLICATIONS ONE MONTH APART.
PLOT NUMBER TWO RATE OF 1000 LBS. PER ACRE ALL AT ONE APPLICATION.	CUTTING PLOT OF PLOT NUMBER TWO.

On plot number three, we put salt on at the rate of 1000 pounds per acre, and instead of applying it all at one time we put it on at the rate of 250 pounds per week for four weeks.

On plot number four we put nitrate of soda on at the rate of 250 pounds per acre all at one application.

The check plots for plot number three and plot number four were east of their respective plots and were of equal dimensions.

The asparagus was cut and weighed (each plot separately) as often as the asparagus reached the proper size. This cutting began on May 8 and was continued till May 26. The tables on the next page will illustrate the influence of the fertilizers upon the weight of the asparagus produced.

INCULUS OF THE FERTILIZATION OF THE PLOTS.

Plot No. 1. The application of salt at the rate of 1000 lbs. per acre all at one application proved to be an efficient fertilizer for increasing the yield of the asparagus. At the first few cuttings the effects were not noted to any great extent, but as the cutting progressed, one can plainly see that the fertilized plot went way ahead of the check plot in production. This shows us that salt has an

FERTILIZER TABLE FOR SALT

At the rate of pounds per acre from each plot.

Date	Salt Plot 1. Lbs a sparagus produced	Check Plot	Salt Plot 3. Lbs. asparagus produced	Check Plot
May				
8	12.90	32.31	12.90	6.40
12	103.60	64.70	-----	-----
14	-----	-----	103.60	77.70
15	-----	-----	155.40	129.50
16	135.98	77.70	38.80	38.80
17	375.55	323.75	129.50	259.00
18	71.23	38.80	51.80	77.70
19.	142.45	135.98	64.75	163.35
20.	181.30	103.60	51.80	103.60

FERTILIZER TABLE FOR NITRATE
OF SODA.

Rate per acre in pounds from each plot.

Date	Plot 2. Nitrate of Soda Lbs. of Asparagus Produced.	Check Plot	Plot 4. Nitrate of Soda. Lbs. of asparagus pro- duced	Check Plot
8	38.80	51.80	64.70	0.00
12	142.45	84.10	97.20	116.50
15	51.80	51.80	142.54	103.60
16.	116.55	116.55	77.70	25.90
17.	106.80	116.55	135.98	103.60
18	32.31	25.90	51.80	38.80
19.	103.60	103.60	90 .60	77.70
20	116.55	171.95	116.50	103.60

effect on the production of asparagus when applied in sufficient quantities.

Plot No. 3. The nitrate of soda when applied at the rate of 150 pounds per acre for four applications, did not prove to be very effective in increasing the production of the asparagus. On the average the check plot had a slightly larger production than the fertilized plot, making the results negative.

Plot No. 5. This plot where salt was applied at the rate of 1000 pounds per acre for four applications also proved to be negative. The check plot had a much larger production than the fertilized plot making the results decidedly negative.

Plot No. 4. This plot fertilized with nitrate of soda at the rate of 250 pounds per acre all at one application, proved to be in favor of the fertilizer. From the very start the fertilized plot showed a much larger production than the check plot.

The results obtained from fertilizing these plots in the way mentioned, prove that the best way to fertilize is by applying the fertilizer all at one application. The salt appears to be the best fertilizer of the two in increasing the production of the asparagus.

TABLE 1. THE DATA OF THE FIRST 30 TESTS OF THE BEAMS
OF 1000/100 mm WITH THE SPACING OF 100 mm, THE CURVE CHARTS.

LOADING STAGE	1. LOAD kN (lb).	2. SPAN mm (in.).	3. DEFLECTION mm (in.).	4. CRACK mm (in.).
1.	7.00 in.	1.50 in.	1.25 in.	
2.	8.00 in.	2.15 in.	3.50 in.	
3.	8.65 in.	3.50 in.	7.75 in.	
4.	9.50 in.	4.48 in.	9.50 in.	
5.	9.50 in.	6.10 in.	7.15 in.	
6.	9.125 in.	7.50 in.	3.61 in.	3.55 in.
7.	8.00 in.	8.15 in.	6.25 in.	6.25 in.
8.	8.00 in.	8.15 in.	6.25 in.	
9.	8.215 in.	8.25 in.	6.25 in.	
10.	8.00 in.	8.50 in.	6.25 in.	6.50 in.
11.		8.25 in.	5.00 in.	6.25 in.
12.		4.50 in.	4.75 in.	4.15 in.
13.		5.00 in.	5.50 in.	5.75 in.
14.		5.15 in.	5.25 in.	6.00 in.
15.		6.15 in.	6.50 in.	7.00 in.
16.		7.05 in.	7.15 in.	8.00 in.
17.		7.40 in.	6.25 in.	8.15 in.
18.		6.50 in.	7.15 in.	7.50 in.
19.		5.75 in.	6.00 in.	6.00 in.
20.		5.50 in.	6.00 in.	6.25 in.
21.		5.50 in.	6.10 in.	6.15 in.
22.		6.50 in.	7.50 in.	7.25 in.
23.		6.25 in.	7.00 in.	7.15 in.
24.		5.10 in.	6.00 in.	6.25 in.

TABLE FOR THE DETERMINATION OF THE TIME REQUIRED TO
 REACH THE SURFACE OF WATER IN A GIVEN DEPTH.

DEPTH IN FATHOMS.	HEIGHT IN FEET.	TIME IN SECONDS.	HEIGHT IN FEET.	TIME IN SECONDS.
1.	9.00.	10.00.	9.00.	12.00.
2.	9.00.	11.00.	10.00.	
3.	11.00.	14.00.	11.00.	
4.	7.00.	10.00.	12.00.	
5.	10.00.	12.00.	13.00.	
6.	9.00.	11.00.	14.00.	
7.	10.00.	11.00.	15.00.	
8.	9.00.	10.00.	16.00.	12.00.
9.	12.00.	14.00.	17.00.	
10.	9.00.	11.00.	18.00.	
11.	11.00.	13.00.	19.00.	
12.	9.00.	10.00.	20.00.	13.00.
13.	12.00.	14.00.	21.00.	
14.	13.00.	15.00.	22.00.	
15.	11.00.	13.00.	23.00.	
16.	9.00.	10.00.	24.00.	
17.	10.00.	11.00.	25.00.	
18.	11.00.	12.00.	26.00.	
19.	12.00.	13.00.	27.00.	
20.	13.00.	14.00.	28.00.	
21.	9.00.	10.00.	29.00.	
22.	10.00.	11.00.	30.00.	
23.	12.00.	13.00.	31.00.	

TABLE CONT'D

TUNING NO.	HEIGHT MAY 15	HEIGHT MAY 17	HEIGHT MAY 18	HEIGHT MAY 20
34	8 oz.	9 oz.	9 oz.	
35.	10 oz.	10 oz.	10 oz.	
36.	9 oz.	8 oz.	9 oz.	9 oz.
37.		10 oz.	10 oz.	14 oz.
38.		7 oz.	7 oz.	9 oz.
39.		9 oz.	9 oz.	9 oz.
30.		9 oz.	9 oz.	11 oz.

CONCLUSIONS

It has been thought not common or that a better fertilizer of higher grade would asparagus grows readily along the coast side.

Nitrate of soda is generally used in connection in the other fertilizers for asparagus, but in this experiment it was found to have some effect on the asparagus production when used alone.

We found that no matter whether nitrate of soda or salt is used, it should be all applied at one application. Salt at 1000 pounds per acre seemed to have a more stronger effect in increasing the production of the asparagus than nitrate of soda at 850 pounds per acre.

The results of putting the asparagus in water in the storage varied a great deal, but it showed that the asparagus should not be kept in storage for any great length of time. The increase in length of the stocks was much more on short than on long stocks, which showed that the increase in length depended upon the maturity of the asparagus when cut.

LITERATURE

1. Bailey, W. D. Asparagus in California. Bulletin No. 2 of State Commission of Hort of California.
2. Harmer, H. H. Asparagus.
3. Jordan, A. T. Experiments with Manures and Fertilizers in Variation of Asparagus and the Onion. Bulletin No. 31, New York.
4. Jordan, T. G. Asparagus in California, Bulletin No. 31, State Commission.
5. Smith, L. H. Asparagus and Asparagus in California, Bulletin No. 135, California.
6. Walker, Ernest. Part I. Asparagus and Onion. Part II. Asparagus growing in Arkansas. Part III. Hybrid in Arkansas. Arkansas Bulletin, No. 25.

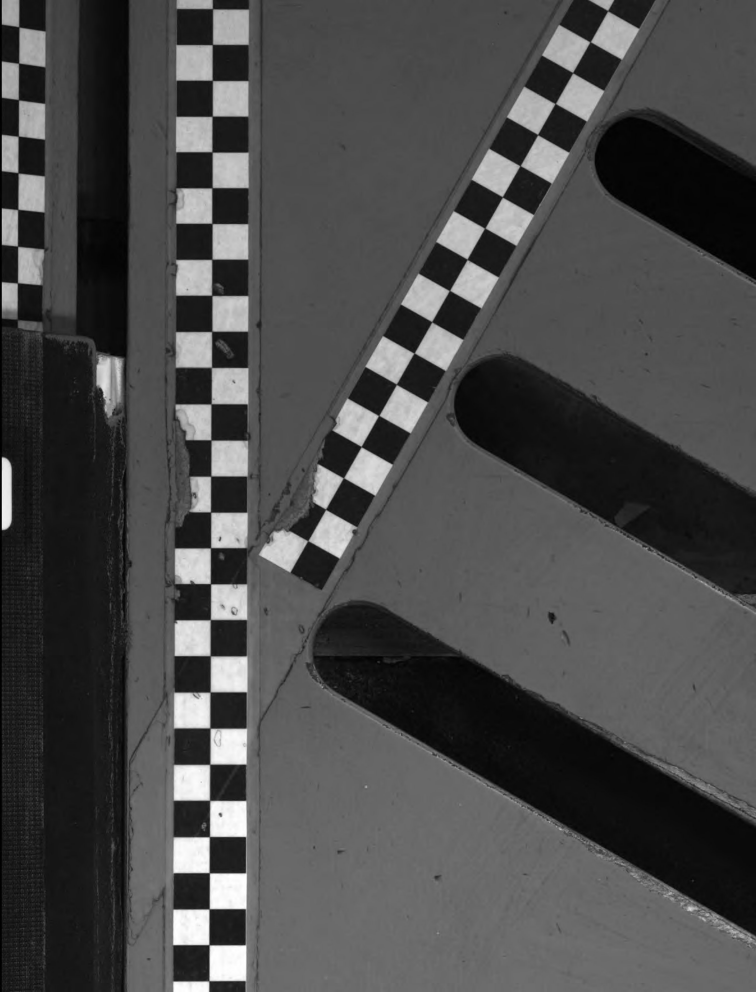
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