

**Dr. T.L.Senn** is a pioneer researcher of organic plant growth stimulants. His credentials also include a wonderful career as a teacher and as the head of the horticulture department at a major university. He is instrumental in proving the value of natural plant stimulants in an expanding set of agricultural applications. His efforts have resulted in the product called NaturesNOG. NOG is an organic concentrate that is applied in various ways to plants and seeds to induce superior growth and increased health and development. These natural growth stimulants improve root growth, leaf content, color, resistances and fruitfulness.

NaturesNOG is completely organic and natural. It is derived from *Ascophyllum nodosum* seaweed and a unique variety of humate. The ingredients are extracted and processed to furnish plants with all the special nutrients that can not be found in common basic fertilizers.

NaturesNOG contains:

Auxin, Cytokinins, ABA, Adenine, IAA, Zeatin and six identified Beatins.  
Mannitol, Alginic Acid, Methylpentosans, Laminarin, Amino Acids and Humic acids.  
Ten vitamin compounds and every mineral from Barium to Zinc (twenty-five).

Recently we were introduced to a new product named BlueYellow, manufactured by the Koch Cellulose Company. BlueYellow is a grass planting system made by incorporating seed into an organic fiber sheet. The sheet is laid on prepared ground and watered to mold it to the surface. The customer can specify the seed variety and starter fertilizer to be put into the sheet. We wanted to learn what effect Nature'sNOG would have on germination, top growth and root development.

Koch Cellulose donated the sample product for this experiment. This sample contained bluegrass seed and starter fertilizer, 8-30-15 at 6.7 lbs./1000 sq.ft.

## PRELIMINARY TESTING

We know that seeds of every kind will respond positively to NaturesNOG. However, seed is normally sprayed directly with solution and immediately planted. Spraying a sheet of organic fiber seemed very different than wetting seeds directly. We felt that the sheet would change the factors of dwell-time and concentration and they had to be better understood before we could control the stimulation affect. We decided to run a pre-trial survey to establish our best methods using many combinations of products and rates. We determined that NaturesNOG at 8 oz. and NaturesNOG-PRO at 4 oz were the best candidates for the official experiment.

## EXPERIMENT SETUP

Soil - we used Fafard 3B potting soil to improve the handling of roots during the later stages of the trial. All pots were filled to the same level with the same amount of wet soil. The soil is wet to prevent shrinkage and channeling when the treatment solutions are applied to the samples.

Location - the greenhouse is oriented on the south side of the house and has several well defined sunlight patterns. We wanted to test in the three available exposures. The shaded location is on a workbench in the middle of the greenhouse and is shaded by shelf above. Location number one is a head-high shelf that is very close to the east glass wall. Location number three is on an identical shelf on the west wall.

Treatment Solution - we determined that 76 mls are required to wet each square foot of sample. We cut the sheet into 6"x 6" pieces and wet them with 19 mls of the test solutions. Stock solutions were prepared based on the formula that 1 ml of product in 2570 ml water is equivalent to 1 oz./20 gl./1000 sq.ft.

The NOG solution was made with 8 ml NOG and 2570 ml. water

The PRO solution was made with 4 ml PRO and 2570 ml. water.

Watering - water was applied 5 days after planting and as needed thereafter. All of the samples received equal amounts on every occasion.

Counts - the number of sprouts in each pot was recorded every day.

Weights - we waited 72 days before removing the plants from the pots for weighting so as not to destroy the root systems.

Location "one" is high on the East wall of the greenhouse.  
The samples are named Cntrl-1, NOG-1 and Pro-1 on the data sheets and the charts.  
The samples are labeled 1/1, 4/1 and 5/1 in the photographs.

Location "two" is on a workbench in the middle of the greenhouse and is shaded by a shelf.  
The samples are named Cntrl-2, NOG-2 and Pro-2 on the data sheets and the charts.  
The samples are labeled 1/ 2, 4/2 and 5/2 in the photographs.

Location "three" is high on the West wall of the greenhouse.  
The samples are named Cntrl-3, NOG-3 and Pro-3 on the data sheets and the charts.  
The samples are labeled 1/3, 4/3 and 5/3 in the photographs.

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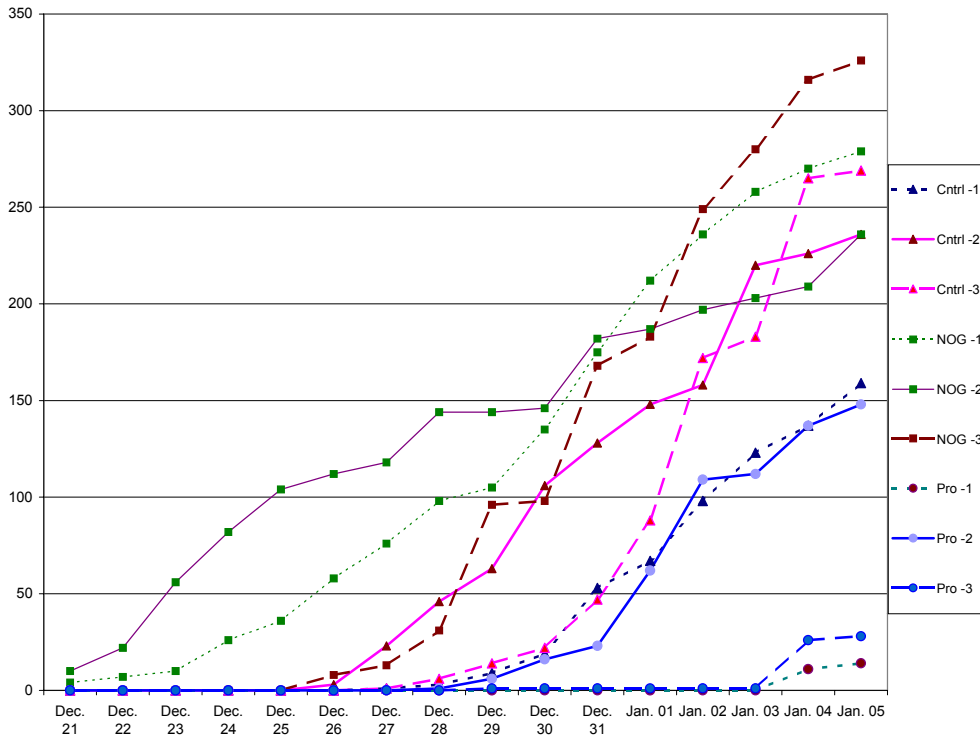
West-side of the Senn greenhouse



Location two



The experiment began on Dec. 7, 2004. The data and charts begin with the first sprout.



	Dec 21	Dec 22	Dec 23	Dec 24	Dec 25	Dec 26	Dec 27	Dec 28	Dec 29	Dec 30	Dec 31	Jan 01	Jan 02	Jan 03	Jan 04	Jan 05
Ctrl-1	-	-	-	-	-	-	1	3	9	19	53	67	98	123	137	159
Ctrl-2	-	-	-	-	-	3	23	46	63	106	128	148	158	220	226	236
Ctrl-3	-	-	-	-	-	-	1	6	14	22	47	88	172	183	265	269
NOG-1	4	7	10	26	36	58	76	98	105	135	175	212	236	258	270	279
NOG-2	10	22	56	82	104	112	118	144	144	146	182	187	197	203	209	236
NOG-3	-	-	-	-	-	8	13	31	96	98	168	183	249	280	316	326
Pro-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	14
Pro-2	-	-	-	-	-	-	-	1	6	16	23	62	109	112	137	148
Pro-3	-	-	-	-	-	-	-	-	1	1	1	1	1	1	26	28

ANALYSIS OF GERMINATION DATA

All the samples at location two showed faster germination. We surmise that this shaded location allowed the pots to remain cooler and wetter. Locations one and three were in direct sunlight, about four feet higher and closer to the glass walls of the green house.

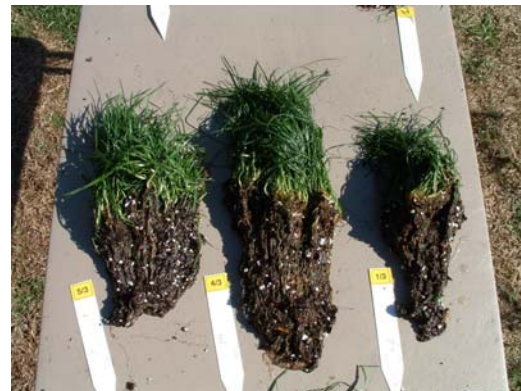
Location three had the highest germination rate for all classes.

The samples treated with NaturesNOG showed faster germination at all locations.

The NaturesNOG-Pro treatment retarded germination at all locations.

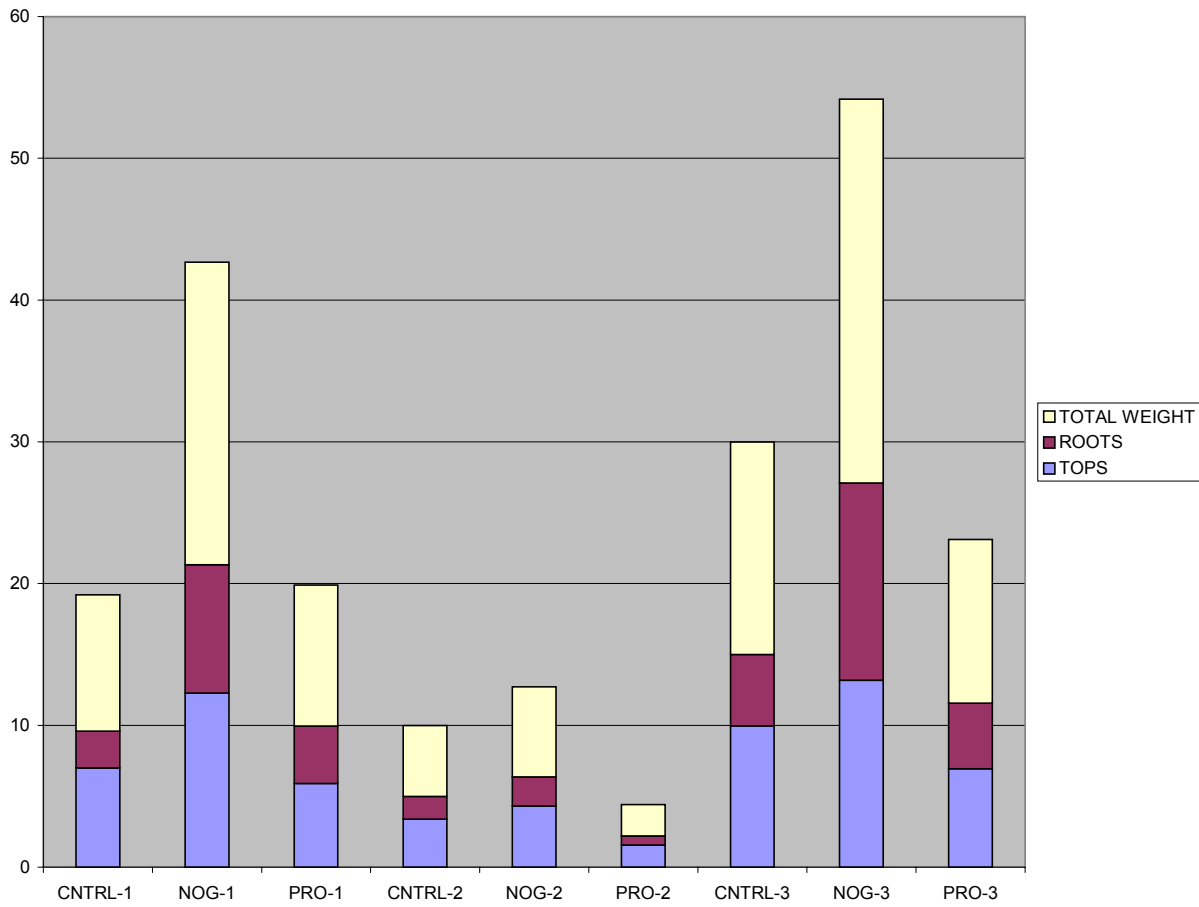
PLANT QUALITY

We extended the trial to give the roots time to grow large enough to withstand handling. On February 17, we prepared the plants for evaluation and weighting.



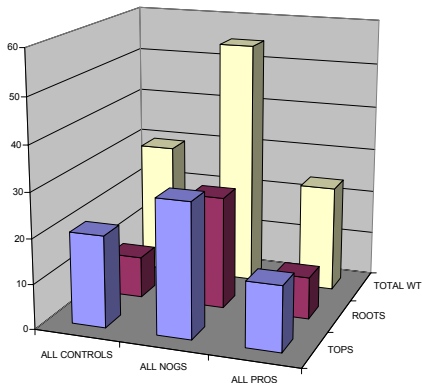
Plants from location three, before

and after washing.

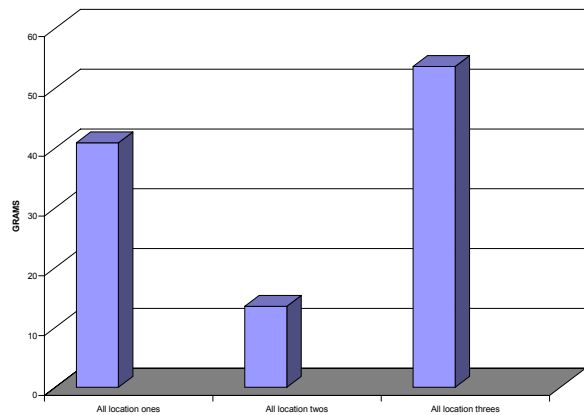


	CNTRL-1	NOG-1	PRO-1	CNTRL-2	NOG-2	PRO-2	CNTRL-3	NOG-3	PRO-
TOPS	7	12.28	5.9	3.38	4.31	1.55	9.97	13.18	6.94
ROOTS	2.6	9.05	4.05	1.61	2.05	0.65	5.02	13.91	4.62
TOTAL WEIGHT	9.6	21.33	9.95	4.99	6.36	2.2	14.99	27.09	11.56

COMPARE ROOT&TOP DEVELOPMENT OF TREATED BLUEYELLOW SAMPLES



AFFECT OF LOCATION



All charts and pictures can be shared for closer inspection.



## ANALYSIS OF WEIGHT DATA

The samples treated with NOG resulted in larger plants with larger roots. The root systems were a greater percent of the total plant weight when compared to the control and the samples treated with Pro. The pattern of increased root development occurred in all locations.

## FINAL ANALYSIS

The samples treated with NOG had 85% more total weight than the control.

The samples treated with NOG had 170% more root weight than the control.

The samples treated with NOG had 49% more top weight than the control.

Roots were 54% of the total plant weight in the NOG samples.

Roots were 31% of the total plant weight in the control samples.

A shaded location will result in inferior growth.

The germination rate and speed may have been improved at locations one and three by keeping the samples wetter. High temperatures and evaporation probably caused a slow start at these locations.

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## PRACTICAL CONSIDERATIONS

Seed germination rates and speed can be improved by spraying the BlueYellow sheet until saturated with a solution of 8 ounces NaturesNOG in 20 gallons of water per 1000 sq.ft. BlueYellow that is treated with NOG will develop larger plants with larger root systems.

Treating BlueYellow with NOG will result in a faster establishment and a healthier lawn. Faster growth means that projects can have an earlier completion date. The "grow-in" period could be shortened. When the turf looks good and play begins, the larger root system will become very important and result in wear-resistance and the strength to repair itself. There is a real value to having healthier plants, but it is not possible to estimate that value until after the season is over.

Initially, we recommend that growers treat the newly laid BlueYellow with NOG before watering and allow the solution to dwell for up to an hour before proceeding with normal wetting.

The cost for such a treatment would be approximately \$7.00/1000 sq.ft.

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This experiment was performed by Senn, Senn & Senn LLC. & Forest Chemical Co. Inc. We thank the people at Koch Cellulose Company for the samples and their assistance.

Reprints of this report can be obtained by contacting:

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