Stress-X is a soluble extract from Ascophylum nodosum seaweed. Concentrated liquid seaweed extract (reconstituted from Stress-X powder) provides plants with trace elements and natural growth hormones that greatly improve health, growth and resistance to stress related problems.

There are 16 trace elements considered essential to plant life; few, if any, are available in conventional fertilizers. Most soils have an abundance of these micronutrients, but they are in rock mineral formations that are relatively unavailable to plants. The trace minerals in seaweed are naturally chelated (bonded) within organic compounds that are more easily broken down by plant and soil systems. Plants are very sensitive to doses of trace elements and there is a fine line between too much and not enough. Seaweed, like other living plants, contains a natural balance of these elements, making it an ideal supplement. Seaweed also contains mannitol, a natural chelating agent that can "unlock" unavailable minerals from the soil.

Trace minerals are a relatively small benefit from using Stress-X compared to the advantages from its growth hormone content. Natural hormones such as cytokinins, gibberellins, and auxins help plants in numerous ways:

1. STRESS: Research has shown that plants treated with growth regulators from seaweed are less susceptible to environmental stress conditions. In many cases, trial plants still grow under extremely stressful conditions. Tests show greatly enhanced resistance to stress from drought, heat, and from internal physiological stress such as germination and flowering. Recent research shows this to be especially true for recreational turf.
2. GROWTH AND DEVELOPMENT: Experiments have proven that seaweed significantly improves the growth and development of all parts of a plant, from the roots to the flowers. Some tests show increases of 2-3 times the root dry matter content compared with control plants (those plants not treated).
3. SEED GERMINATION: In all cases tested, the speed of germination and the percentage of seeds germinated were significantly increased whenever seaweed extract was applied.
4. DISEASES: Scientists have noted that seaweed, due to its cytokinin content, positively affects the resistance of plants to diseases. The applied cytokinins apparently allow the plant time to increase its resistance to the disease.
5. INSECTS: As early as the 1940's, there were reports that the hormones in seaweed could be valuable in controlling certain insect pests. Experiments have shown that seaweed can increase certain plants' resistance to aphids, flea beetles, mites and nematodes. Non-scientific trials noted increased resistance to other insect species as well.
6. SHELF LIFE: Research on various types of fruits and vegetables grown with applications of seaweed extract indicate a significantly longer shelf life than the controls with which they were compared.
7. SENESCENCE: It is suggested that the hormones in seaweed inhibit senescence (aging) of plants and their produce. Inhibiting the rate at which a plant ages has incredible implications including greater production, longer ornamental value and increased propagation potential. Seaweed has been shown to increase the lifespan of annuals and decrease the dormancy period of most perennial plants.
8. ROOTING: Scientists report that root growth is significantly improved whenever seaweed extract is applied, whether as a foliar spray or applied to the soil or rooting media. It has also been shown to accelerate absorption of plant nutrients by root systems.
9. CHELATION: Seaweed contains mannitol, a natural chelating agent that has been shown to make available micronutrients within the soil that would otherwise be inaccessible.
10. SUGAR CONTENT: Experiments have shown significant increases in sugar content of various fruits and vegetables from applications of seaweed extract.
11. ENZYMES: Seaweed extract provides micronutrients essential to plants for the production of catalytic enzymes. These enzymes are critical in almost every function of a living plant from photosynthesis to reproduction.

In addition to all these benefits, Stress-X is biologically active and when introduced to the soil it stimulates the procreation of beneficial microorganisms. The result is accelerated growth, increased fruiting and flowering, intensified coloration, and significantly less need for pest and disease controls.

APPLICATION GUIDE

Suggested rates and dosages are approximate and may vary depending on the climatic region, soil type, and fertility. Additional applications can be made immediately prior to or following stress periods such as frost or drought. It is preferable to increase the frequency of applications rather than the concentration of the solution. Lower dilution rates should be applied to less dense foliage. Increase to higher rates as foliage matures. Soil drenches are preferable to foliar applications, where practical, as Stress-X will stimulate soil biological activity in addition to plant growth.

FRUIT	Dosage per Acre per Application	Foliar Application Stages				
		1st	2nd	3rd	4th	Optional
Apples, Pears	**8-12 oz**	Green tip (tight cluster)	Pre-bloom pink bud	Full bloom	Early fruit formation	Every 21 days until harvest
Citrus	**15-18 oz**	Early bloom	Petal fall	With summer spray	With fall spray	6-9 weeks prior to harvest
Grapes	**8-12 oz**	At 8-12 in. cane	At 18-24 in. cane	Full bloom	Berry set – early shattering	2-3 weeks later
Stone Fruit	**12-15 oz**	Pink or white bud	Full bloom	Early fruit formation	3 weeks later	3 weeks later
Strawberries: -Annual Crop	**8-12 oz**	Prior to transplant	At first bloom	At first fruit set	Every 3-4 weeks to mid-point in harvest season	
-Perennial Crop	**8-12 oz**	Early spring growth				

VEGETABLES	Dosage per Application 8-12 oz /Acre per application	Foliar Application Stages			
		1st	2nd	3rd	Optional
Beans, Peas		At 4-6 leaf stage	At first bloom	At first pods	
Carrots, onions, leeks, turnips		2-3 weeks after emergence	At root enlargement	Every 10-14 days until harvest	
Broccoli, cauliflower, cabbage		At 4-6 true leaf stage	10-14 days later	At head initiation	
Sweet corn		At 2-6 leaf stage	20-30 in. growth stage	Just prior to tasselling	
Cucumbers, pickles		At 1st 4 true leaves	First pre-bloom	7-14 days later	Within 40 hrs of each picking
Eggplants, peppers, melons, squash		At 0-8 in. growth	Pre-bloom stage	At fruit set	Within 48 hrs of each picking
Greens		At 4 leaf stage	Regularly every 14 days		
Potatoes		At tuber set	10-14 days later	Early bloom	
Tomatoes (fresh market varieties)		At 6-8 in. growth	At pre-bloom	At fruit set	Within 48 hrs of each picking
Tomatoes (processing varieties)		At 6-8 in. growth	At pre-bloom	At fruit set	14 days later

TURF	Dosage per application	Start foliar applications at initial growth stage and continue at 3-4 week intervals. Make additional applications after periods of stress or heavy use, to newly applied sod and as a late season spray to help improve resistance to winter-kill and frost damage.
	8-12 oz	

GREENHOUSE INJECTION SYSTEMS	Dosage per application	Mix dose in one gallon of water and inject at a dilution rate of 100:1. Apply every 3-4 weeks or after periods of stress.
	8-12 oz	

TREES, SHRUBS, AND PERENNIALS	For Transplants, mix 1 oz. per 10 gallons of water and drench the root-ball before planting. Soak bare rootstock in the mixture for 20 minutes before planting. For established plants soak the ground under the drip-line or foliar feed a mixture of 1 oz. per 15 gallons of water

Stress-X Powder reconstitutes into concentrated liquid seaweed and a relatively small amount goes a long way. Five gallons of concentrate (from 1500 grams of sea extract powder) will treat two acres for a year. Cost of the product is also relatively small; between 35¢ and 45¢ per thousand square feet (per year). One small box contains 1500 grams (3.3 lbs) of soluble powder and makes 5 gallons of liquid concentrate. 300 grams (10.6 oz) of soluble powder makes 1 gallon of liquid concentrate. 75 grams (2.6 oz) of soluble powder makes one quart of liquid concentrate. Mix powder with a small amount of warm water to make a slurry first before adding the total amount of water needed to make the liquid concentrate or ready-to-use (RTU). NCO recommends using approximately 3 gallons of liquid concentrate per acre per year but no more than 1 gallon per acre per application. If more than 3 applications are intended, divide the number of intended applications into 3 gallons. The answer is the amount to use per application. *Example: Customer wants to spray every other week for 16*

weeks (total number of applications=8). 3 ÷ 8 = .375 (To convert to cups [8 ounces], multiply by 16.) 0.375 X 16 = 6 cups or 3 pints. So we would recommend using 3 pints of liquid concentrate per acre per application. Do not use more than 3-4 gallons of liquid concentrate per acre per year. There is no danger of over-dosing; however, any more than that is not economical. When in doubt, use 1 Tbsp of liquid concentrate to 1 gal water. This equals 1 part concentrate to 256 parts water (256:1 RTU). Use 1 Tbsp of concentrate per 100 sq ft of seedling flats, garden rows, etc.

3 grams of soluble powder per gallon of water makes a 100:1 RTU (*uses: transplanting, seedling flats, new seeding*). 1.5 grams of soluble powder per gallon of water makes a 200:1 RTU (*general use*). When using a greenhouse injector, dissolve 10.6 oz (300 gr) of powder per gallon of water and inject at 100:1.

STRESS-X POWDER NEEDED TO MAKE A READY-TO-USE (RTU) DILUTION

	Ounces of Stress-X Powder needed				
Gallons (RTU)	**50:1**	**100:1**	**150:1**	**200:1**	**250:1**
1	0.20	0.10	0.07	0.05	0.04
5	1.00	0.50	0.35	0.25	0.20
10	2.00	1.00	0.70	0.50	0.40
25	5.00	2.50	1.75	1.25	1.00
50	10.00	5.00	3.50	2.50	2.00
100	20.00	10.00	7.00	5.00	4.00
200	40.00	20.00	14.00	10.00	8.00
300	60.00	30.00	21.00	15.00	12.00
400	80.00	40.00	28.00	20.00	16.00
500	100.00	50.00	35.00	25.00	20.00
1000	200.00	100.00	70.00	50.00	40.00

Note: to convert ounces to grams, multiply by 28.35.

See also Tree Fertilizing with Liquids

Approved by NOFA. It is a pure extract and is not fortified. The product is produced in Nova Scotia.