Commercial extracts of the brown seaweed *Ascophyllum nodosum* and silicon reduce plant death due to *Fusarium solani* and increase yields of cucurbits

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Crop losses due to *Fusarium solani* are of significant importance to cucurbit growers, and many growers have an increasing interest in safe and natural ways to improve disease resistance. A commercial extract of the brown seaweed, *Ascophyllum nodosum* and products containing silicon have both been shown to promote disease resistance on many crops. In a 2008 watermelon trial located in Upper Marlboro, MD, *Fusarium solani* symptoms were suppressed by commercial extracts of *Ascophyllulm nodosum*. At both early and mid-season ratings there were significantly more dead plants in the untreated plots than in the *Ascophyllum* extract treatments. At the final rating late in the growing season, 30% of the watermelon plants were dead from this disease in the control plots vs. 10% in *Ascophyllum* extract treatments. A second study was implemented in 2009 on *Gladiator* Pumpkins. Calcium Silicon and *Ascophyllum* seaweed extract were applied to pumpkins grown in a field known to have *Fusarium* spp. infected squash plants three years prior. At the final rating late in the growing season, 24.6% of the pumpkin plants were dead from this disease in the control plots vs. 19.2% in the silicon plots, 13.6% in *Ascophyllum* extract treatments, and 6.1% in the plots treated with both calcium silicate and *Ascophyllum* seaweed extract. These field studies were further supported by two greenhouse studies where applications *Ascophyllum* seaweed extract to cucumber plants reduced incidence of *Fusarium oxysporum* and enhanced the activities of the plant defense-related enzymes chitinase, β-1,3-glucanase, peroxidase, polyphenol oxidase, phenylalanine ammonia lyase and lipoxigenase as well as elevated levels of total phenols compared to the control.