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Silicon

SILICON FERTILIZERS

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THE NEW NUTRIENT

6 keys to achieve Growth and Yield SILIC^on INCREASES

- Resistance to Disease and Pest
- Cell Structure
- Photosynthetic Activity
- Uptake of Nutrients
- Resistance to Environmental Stresses
- Post Harvest Life

6 keys to achieve Growth and Yield
Silicon Increases

Resistance to Disease and Pest

Si deposition in the epidermis tissues provides a physical barrier to pathogens and insects, allowing for a reduction in the frequency of chemical applications.

Cell Structure

Si accumulated un the epidermal tissues increases the mechanical estability of the plant. Reduces the incident of lodging.

Photosynthetic Activity

The improved structure produces stronger stems with more erect leaves, increasing its ability to capture light.

6 keys to achieve Growth and Yield Silicon Increases

Uptake of Nutrients

Particularly Nitrogen, Phosphorous, Potassium and Micronutrients.

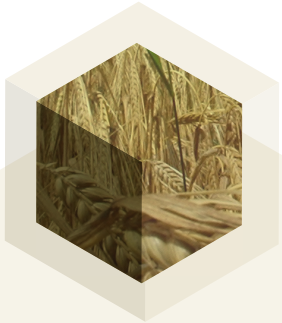
Resistance to Environmental Stresses

- Reduced drought and heat stress. The deposition of Si in the plant tissues reduces transpiration rates.
- Reduce salt stress by inhibiting Sodium uptake.
- Alleviate toxicity of heavy metals: Iron, Manganese, Cadmiun, Aluminium, and Zinc by regulating plant uptake

Post Harvest Life

Si can associate with cell wall proteins where it might exert an active production of defence compounds.

8 Groups of Crops in which Silicon works

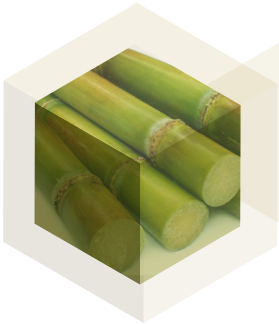


Cereals

Wheat, Barley
Rice
Maize
...

Cotton

Banana

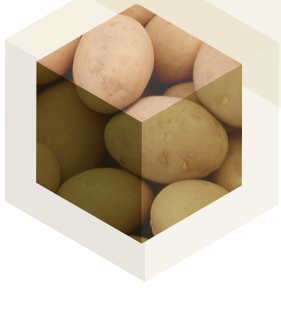


Sugar Cane

Silicon

Vegetables

Chilli
Cucurbit
Onion
Tomato
Strawberry
...



Potato

Turf

Fruit Trees

Avocado
Pomegrenade
Date Palm
...

Silicon Increases The Resistance Of Some Plant Species Against Diseases

CROP	DISEASE	REFERENCE
Rice	SHEATH BLIGHT NECK BLAST LEAF BLAST BROWN SPOT LEAF SCALD STEM ROT	Rodrigues et al (2001) Datnoff et al (1991) Seebold et al (2001) Datnoff et al (1991) Seebold et al (2000) Seebold et al (2000)
Wheat	POWDERY MILDEW	Menzies et al (2002)
Cucumber	POWDERY MILDEW	Menzies et al (1991)
Sugarcane	SUGARCANE RING SPOT	Matichenchov & Calvert (2002)
Barley	POWDERY MILDEW	Jiang et al (1989)
Cowpea	RUST	Heath & Stumpf (1986)
Grass	LEAF SPOT	Brecht et la (2004)
Rose	PODOSPHAERA PANNOSA	Shetty et la (2004)

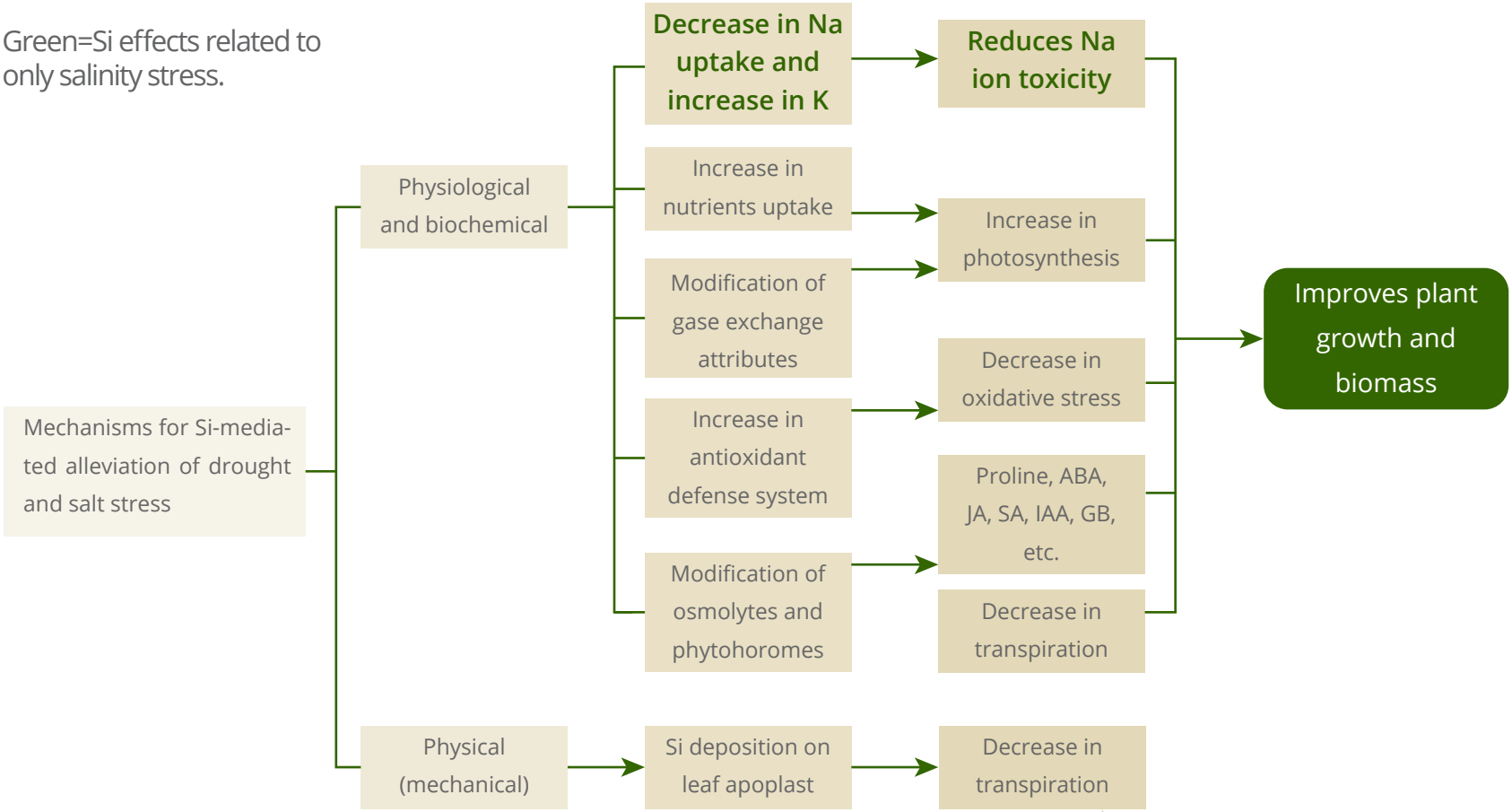
Effects of silicon on some soil-borne and seed-borne diseases

Hosts	Diseases	Pathogens	Effects[a]	References
Avocado	Phytophthora root rot	*Phytophthora cinnamomi*	⊕	Bekker et al. (2005)
Banana	Root rot	*Cylindrocladium spathiphylli*	⊕	Vermeire et al. (2011)
	Panama disease	*Fusarium oxysporum f. sp. cubense*	⊕	Fortunato et al. (2012)
	Root-knot nematode	*Meloidogyne javanica*	⊕	Oliveira et al. (2012)
Bell pepper	Phytophthora blight	*Phytophthora capsici*	⊕	Lee et al. (2004), French-Monar et al. (2010)
Bitter gourd	Pythium root rot	*Pythium aphanidermatum*	⊕	Heine et al. (2007)
Coffee	Root-knot nematode	*Meloidogyne exigua*	⊕	Silva et al. (2010)
Corn	Pythium root rot	*Pythium aphanidermatum*	⊕	Sun et al. (1994)
	Stalk rot	*Fusarium moniliforme*	⊕	
Creeping betgrass	Pythium root rot	*Pythium aphanidermatum*	⊕	North Carolina State University (1997), Schmidt et al. (1999), Rondeau (2001), Uriarte et al. (2004), Zhang et al. (2006)
	Dollar spot	*Sclerotinia homoeocarpa*	⊕	
	Brown patch	*Rhizoctonia solani*	⊕	
Cucumber	Crown and root rot	*Pythium ultimum*	⊕	Chérif and Bélanger (1992)
	Crown and root rot	*Pythium aphanidermatum*	⊕	Chérif et al. (1994)
	Fusarium wilt	*Fusarium oxysporum f. sp. cucumerinum*	⊕	Miyaki and Takahashi (1983)
Lettuce	Fusarium wilt	*Fusarium oxysporum f. sp. lactucae*	⊕	Chitarra et al. (2013)
Melon	Fusarium root rot	*Fusarium spp.*	⊕	Liu et al. (2009)
Oil palm	Basal stem rot	*Ganoderma boninense*	⊕	Najihah et al. (2015)
Perennial ryegrass	Fusarium patch	*Microdochim nivale*	⊕	MacDonagh and Hunter (2010)
Rice	Root knot nematodes	*Meloidogyne spp.*	⊕	Swain and Prasad (1988)
	Grain discoloration	*Many fungal species*	⊕	Winslow (1992), Korndörfer et al. (1999), Prabhu et al. (2012), Dallagnol et al. (2013, 2014)
Soybean	Phytophthora root rot	*Phytophthora sojae*	⊕	Guérin et al. (2014)
Tomato	Fusarium crown and root rot	*Fusarium oxysporum f. sp. radices-lycopersici*	⊕	Guérin et al. (2014)
	Pythium root rot	*Pythium aphanidermatum*	⊕	Heine et al. (2007)
	Bacterial wilt	*Ralstonia solanacearum*	⊕	Dannon and Wydra (2004), Kiirika et al. (2013)
Watermelon	Gummy stem blight	*Didymella bryoniae*	⊕	Santos et al. (2010)
Wheat	Foot rot	*Fusarium spp.*	⊕	Rodgers-Gray and Shaw (2000; 2004)
Zoysiagrass	Brown patch	*Rhizoctonia solani*	⊕	Saigusa et al. (2000)

[a] Silic[on] decrease (⊕) on disease intensity

Mechanisms for Si-mediated alleviation of drought and salt stress in plants

Green=Si effects related to only salinity stress.



Rizwan M. et al (2015)

4 Range of Silic Products

Silicon

Silicon (SiO_2) 15,0% w/w
Potassium (K_2O) 12,5% w/w

Silicon MOL

Silicon (SiO_2) 8,5% w/w
Humic acids 6,4% w/w

Silicon Ca Flow

Silicon (SiO_2) 24,0% w/w
Calcium (CaO) 21,5% w/w

Silicon MAG Flow

Silicon (SiO_2) 28,0% w/w
Magnesium (MgO) 14,0% w/w

Silicon Ca Mg Flow

Silicon (SiO_2) 34,0% w/w
Calcium (CaO) 11,0% w/w
Magnesium (MgO) 10,0% w/w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