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Sonar Silic

IMPORTED FROM EU

Keys to achieve Growth and yield

Sonar silic increases:

1. Resistance to disease and pest
2. Photosynthetic activity
3. Uptake of nutrients
4. Resistance to environmental stresses
5. Post-harvest life
6. Increase yield

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Keys to achieve Growth and yield

Sonar silic increases:

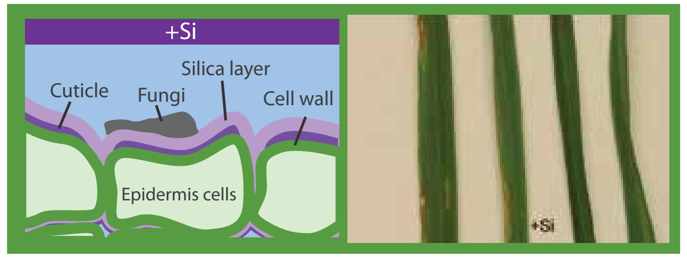
1 Resistance to disease and pest

The role of silicon on plants-pathogen interactions*

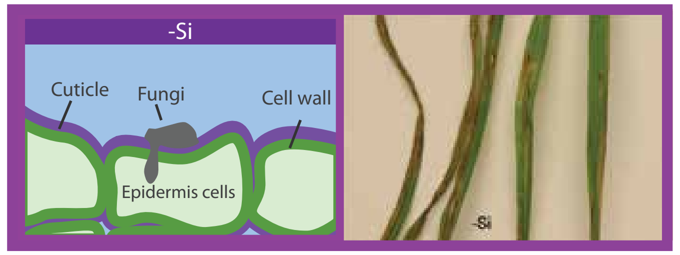
Physical mechanisms
- Cuticle-Si double layer formation.
- Cell wall rigidity and reinforcement.
- Papillae formation.

Biochemical mechanisms
- Defense-related enzymes activation.
- Antimicrobial compounds production.
- Systemic signaling regulation.

Molecular mechanisms
- Defense-related enzymes activation.
- Antimicrobial compounds production.
- Systemic signaling regulation.



With silicon



Without silicon

*Wang et al. 2017

Keys to achieve Growth and yield

Sonar silic increases:

2 Photosynthetic activity

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

3 Uptake of nutrients

Particularly Nitrogen, Phosphorous, Potassium and Micronutrients.

4 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

Keys to achieve Growth and yield

Sonar silic increases:

5 Post-harvest life

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

6 Increase yield

Effects of silicon on maize ears and grain yield.

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Groups of Crops in which Sonar Silic works

Fruit trees
- Avocado
- Pomegrenade
- Date Palm
- etc

Potato

Cereals
- Wheat
- Barley
- Rice
- Maize, etc

Turf

Banana

Sugar cane

Vegetables
- Chili
- Cucurbit
- Onion
- Tomato
- Strawberry
- etc

Cotton

Grapes

Ornamental

Silicon products

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Composition	%w/w
Silicon (SiO_2)	21
Potassium (K_2O)	11,5

Silicon and Potassium fertilizer

soil foliar

sonar Silic Calcium

Composition	%w/v
Silicon (SiO_2)	24,0
Calcium (Ca)	15,0
Density	1,40
pH	7-8

soil foliar

1L 5L 20L 200L 1000L

Silicon products

sonar Silic Ca Mg

Composition	%w/w
Silicon (SiO2)	18,0
Calcium CaO)	13,5
Magnesium (MgO)	5,5

Density: 1,3

pH: 5-6

Silicon and Calcium Magnesium Fertilizer

foliar

Sonar SilicFulvic

Composition	%w/w
Silicon (SiO_2)	7,0
Calcium Oxide (CaO)	7,0
Fulvic acids	14,5

Silicon and Calcium fertilizer with Fulvic acids

soil foliar

1L 5L 20L 200L 1000L

Plants and diseases

Sonar silic increases the resistance of some plant species against diseases:

Plant		Diseases
	**Rice**	Sheat blight Leaf blast brown spot leaf scald Stem rot
	**Wheat**	Powdery mildew leaf spot (septoria)
	**Cucumber**	Root diseases (pythium) Stem roting Stem lesions
	**Sugarcane**	SUgarcane ring spot Leaf freackle Sugarcane rust
	**Barley**	Powdery mildew Leaf spot
	**Cowpea**	Rust
	**Grape**	Powdery mildew
	**Grass**	Leaf spot
	**Rose**	Podosphaera pannosa

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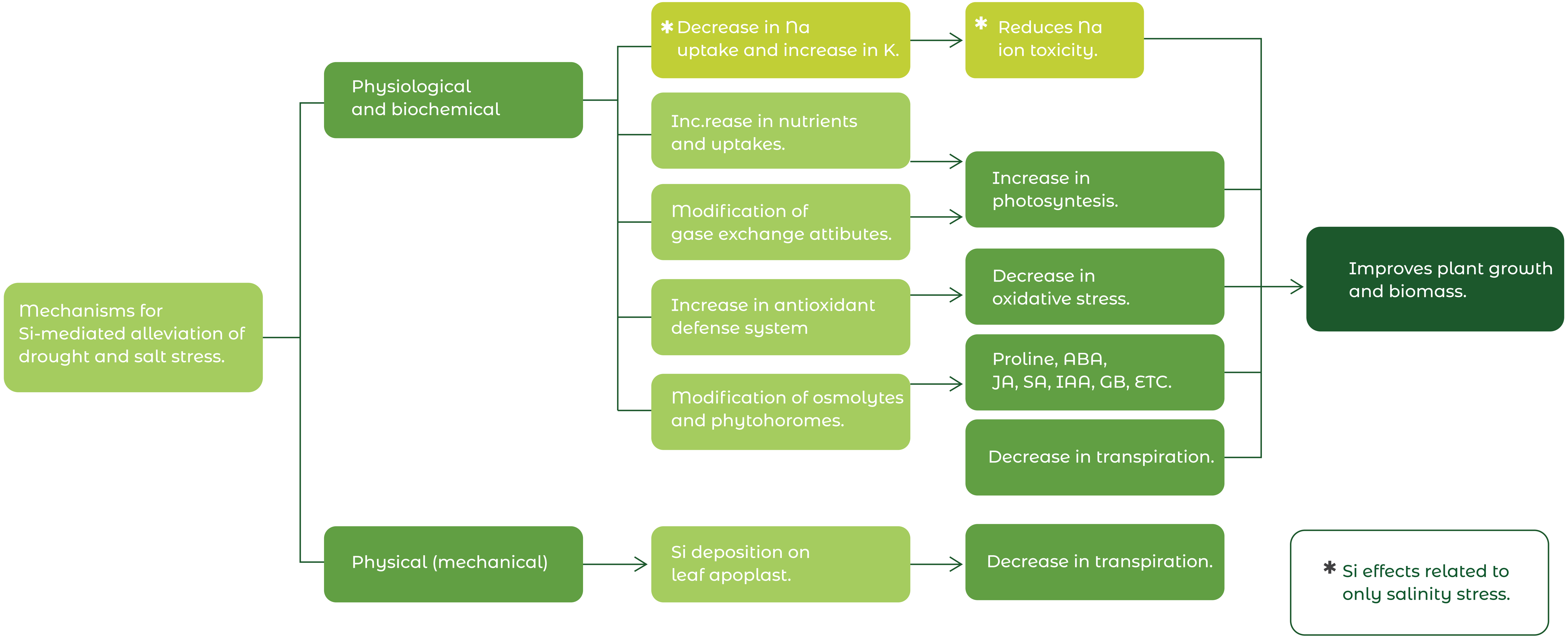
Effects of silicon on some-borne and seed-borne diseases

Hosts	Diseases	Patogens	Effects	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)
	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)
Corn	Stalk rot	Fusarium moniliforme	-----	
Creeping betgrass	Pythium root rot	Pythium aphanidermatum	-----	North Carolina State University (1997), Schmidt et al. (1999)
	Dollar spot	Sclerotinia homoeocarpa	-----	Rondeau (2001), Uriarte et al. (2004), Zhang et al. (2006)
	Brown patch	Rhizoctonia solani	-----	
Cucumber	Crown and root	Pythium ultimum	-----	Chérif and Bélanger (1992)
	Crown and root	Pythium aphanidermatum	-----	Chérif et al. (1994)
	Fusarium wilt	Fusarium oxysporum f. sp. cucumerinum	-----	Miyaki and Takahashi (1983)

Hosts	Diseases	Patogens	Effects	References
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)

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

Rizwan M. et al (2015)



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