



PLANT WITH INCREASED SILICON UPTAKE

Value Proposal:

Si absorption in plants plays an important role in conferring both biotic and abiotic stress tolerance. As a result, many studies have reported Si as a beneficial element that enhances plant growth and yield. However, Si accumulation in plants is under strict genetic control mediated by two genes, an influx transporter, (*Lsi1*) able to extract silicic acid from the soil and an efflux transporter (*Lsi2*), able to transfer Si from the roots to the upper parts of the plant. The presence and activity of those genes will determine if and how much a plant can accumulate Si and thus derive benefit from it. We have discovered a very rare *Lsi2* allele in soybean that allows plants to accumulate 2-3 fold higher Si concentrations, which in turn naturally protects said plants against a variety of stresses.

Applications

- . To develop new soybean cultivars with a high Si accumulation capacity and better yield, through breeding, genetic modification or any other forms of plant propagation.
- . To select a progeny wherein the progeny comprising the marker has high Si uptake and greater resistance to stress.

Non-confidential Description:

The invention relates to:

- . nucleic acid sequences defining a genomic region conferring high silicon (Si) accumulation as discovered in the soybean (*Glycine max*) cultivar *Hikmok sorip*, a public Korean cultivar with high ability to absorb Si;
- . Plants having the region, corresponding to from about 33.1Mb to about 35.7 Mb of chromosome 16 from the *Hikmok sorip* named HiSil, introduced in its nucleic acid exhibit increased Si uptake;
- . Markers associated with high Si accumulation and methods of identifying high Si accumulating plants.

Advantages

- Soybean lines carrying *HiSil* display greater resistance to soybean rust, *Phytophthora* root rot, water stress etc.
- Resistance is expressed naturally and is easily introgressed into elite lines
- Si is naturally present in nature and plants and never displays phytotoxicity
- Versatile solution to prevent adverse effects of climate change such as drought, flooding, diseases etc.

Market

- In the Americas, soybeans are grown on close to 100M ha and represent a market whose value exceeds 100 billion US\$/yr.
- Together, biotic and abiotic stresses are estimated to cause yearly losses of 20%.
- An overall attenuation of such stresses amounting to only 10% of these losses would bring annual benefits worth 2 billion US\$.

Reference Number:

Tech ID: 01523

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Sector:

Plant-breeding

Category:

Soybean (*Glycine max*)

Keywords:

Silicon uptake, stress resistance

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Development Status:

Proof-of-concept, Field validation

Intellectual Property:

US 15/574,414
CA 2,988,354
Priority Date: 20/05/2015

Date of review:

July 25, 2019

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