

Name: *diageotropica* (*dgt*)

Accessions: H1 (LA4482)

Gene ID: Solyc01g111170

Map position: chromosome 1 (long arm)

Gene function: cyclophilin biosynthesis

Gene effect: plants with the mutated allele have low sensitivity to the hormone auxin.

Phenotypes: MT-*dgt* presents hyponastic leaves, plagiotropic roots with fewer ramifications and slender stems.

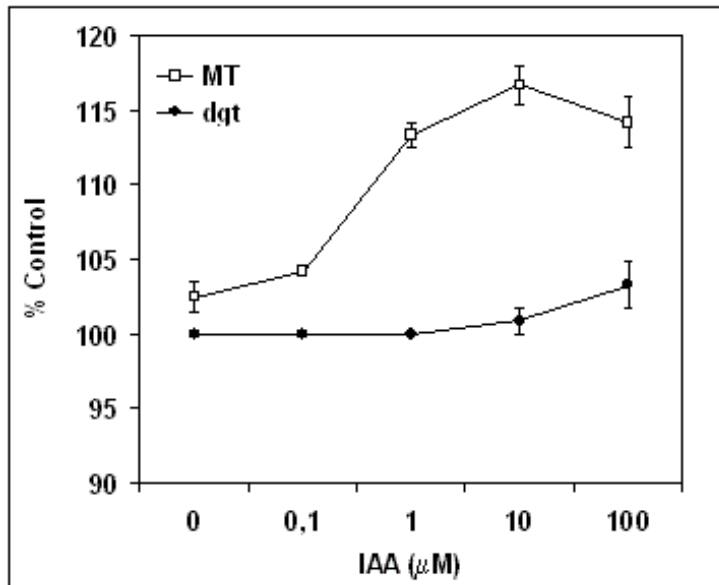
Comments:

Description of accessions available: MT-*dgt* is a BC6Fn introgressed from LA1529

Figures:



MT-*dgt* (left) showing hyponastic leaves and a slender shoot



Hypocotyls from the MT-*dgt* are insensitive to auxin (IAA).

Bibliography

- of special interest
- of outstanding interest

Albert M, Werner M, Proksch P, Fry SC, Kaldenhoff R (2004) The cell wall-modifying xyloglucan endotransglycosylase/hydrolase *LeXTH1* is expressed during the defence reaction of tomato against the plant parasite *Cuscuta reflexa*. *Plant Biology* 6: 402-407.

• Balbi V, Lomax TL (2003) Regulation of early tomato fruit development by the *diageotropica* gene. *Plant Physiology* 131:186-197.

Bradford KJ, Yang SF (1980) stress-induced ethylene production in the ethylene-requiring tomato mutant *diageotropica*. *Plant Physiology* 65:327-330

Carvalho RF, Quecini V, Peres LEP (2010) Hormonal modulation of photomorphogenesis-controlled anthocyanin accumulation in tomato (*Solanum lycopersicum* L. cv Micro-Tom) hypocotyls: Physiological and genetic studies. *Plant Science*, 178:258-264.

Carvalho RF, Campos ML, Pino LE, Lombardi-Crestana SL, Zsogon A, Lima JE, Benedito VA, Peres LEP (2011) Convergence of developmental mutants into a single tomato model system: Micro-Tom as an effective toolkit for plant development research. *Plant Methods*, 7:18.

••Christian M, Steffens B, Schenck D, Lüthen H (2003) The *diageotropica* mutation of tomato disrupts a signalling chain using extracellular auxin binding protein 1 as a receptor. *Planta* 218:309-314.

••Coenen C, Bierfreund N, Lüthen H, Neuhaus G (2002) Developmental regulation of H⁺-ATPase-dependent auxin responses in the *diageotropica* mutant of tomato (*Lycopersicon esculentum*) *Physiologia Plantarum* 114: 461–471

Coenen C, Christian M, Lüthen H, TL Lomax (2003) cytokinin inhibits a subset of *diageotropica*-dependent primary auxin responses in tomato. *Plant Physiol* 131:1692-1704.

Coenen C, Lomax TL (1998) The *diageotropica* gene differentially affects auxin and cytokinin responses throughout development in tomato. *Plant Physiology* 117:63-72.

Daniel SG, Rayle DL, Cleland RE (1989) Auxin physiology of the tomato mutant *diageotropica*. *Plant Physiology* 91:804-807.

Fujino DW, Nissen SJ, Jones AD, Burger DW, Bradford KJ (1988) Quantification of Indole-3-acetic acid in dark-grown seedlings of the *diageotropica* and *epinastic* mutants of tomato (*Lycopersicon esculentum* Mill.). *Plant Physiology* 88:780-784

Gratão PL, Monteiro CC, Rossi ML, Martinelli AP, Peres LEP, Medici LO, Lea PJ, Azevedo RA (2009) Differential ultrastructural changes in tomato hormonal mutants exposed to cadmium. *Environmental and Experimental Botany* 67:387-394.

••Hicks GR, Rayle DL, Lomax TL (1989) The *diageotropica* mutant of tomato lacks high specific activity auxin binding sites. *Science* 245:52-54.

•Ivanchenko MG, Coffeen WC, Lomax TL, Dubrovsky JG (2006) Mutations in the *diageotropica* (*dgt*) gene uncouple patterned cell division during lateral root initiation from proliferative cell division in the pericycle. *Plant Journal* 46:436–447.

•Kelly MO, Bradford KJ (1986) Insensitivity of the *diageotropica* tomato mutant to auxin. *Plant Physiology* 82:713-717.

Kraepiel Y, Agnès C, Thiery L, Maldiney R, Miginiac E, Delarue M (2001) The growth of tomato (*Lycopersicon esculentum* Mill.) hypocotyls in the light and in darkness differentially involves auxin. *Plant Science* 161:1067-1074

Lavy M, Prigge MJ, Tigyi K, Estelle M (2012) The cyclophilin DIAGEOTROPICA has a conserved role in auxin signaling. *Development* 139, 1115-1124

Lima JE, Benedito VA, Figueira A, Peres LEP (2009) Callus, shoot and hairy root formation in vitro is affected by the sensitivity to auxin and ethylene in tomato mutants. *Plant Cell Reports* 28: 1169-1177.

Mito N, Bennett AB (1995) The *diageotropica* mutation and synthetic auxins differentially affect the expression of auxin-regulated genes in tomato. *Plant Physiology* 109:293-297.

Muday GK, Lomax TL, Rayle DL (1995) Characterization of the growth and auxin physiology of roots of the tomato mutant, *diageotropica*. *Planta* 195:548-553.

- Nebenführ A, White TJ, Lomax T (2000) The *diageotropica* mutation alters auxin induction of a subset of the *Aux/IAA* gene family in tomato. *Plant Molecular Biology* 44:73-84.

- Oh K, Ivanchenko MG, White TJ, Lomax TL (2006) The *diageotropica* gene of tomato encodes a cyclophilin: a novel player in auxin signaling. *Planta* 224: 133-144.

Park WJ (1998) Effect of epibrassinolide on hypocotyl growth of the tomato mutant *diageotropica*. *Planta* 207:120-124.

Rice MS, Lomax TL (2000) The auxin-resistant *diageotropica* mutant of tomato responds to gravity via an auxin-mediated pathway. *Planta* 210:906-913.

Ursin VM, Bradford KJ (1989) A unique phenotype in heterozygotes of the auxin-insensitive mutant of tomato, *diageotropica*. *Plant Physiology* 90:1243-1245.

Ursin VM, Bradford KJ (1989) Auxin and ethylene regulation of petiole epinasty in two developmental mutants of tomato, *diageotropica* and *epinastic*. *Plant Physiology* 90:1341-1346.

Zobel RW (1972) Genetics of the *diageotropica* mutant in the tomato. *Journal of Heredity* 63:94-97.

Zobel RW (1973) Some physiological characteristics of the ethylene-requiring tomato mutant *diageotropica*. *Plant Physiology* 52:383-389.

Zobel RW (1974) Control of morphogenesis in the ethylene-requiring tomato mutant, *diageotropica*. *Canadian Journal of Botany* 52:735-741