## Comparative Functional analysis of *ovate* gene in the solanaceous species

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## Introduction

Solanaceae is the third most economically important plant taxa worldwide, having high agricultural utility. It is comprised of more than 3000 species, including fruit-bearing vegetables, ornamental plants, plants with edible leaves and medicinal plants. There is a high level of conservation (2n=24) among major species, that make it an excellent model for understanding fruit and tuber



development and plant defense. *Ovate* as a major quantitative trait locus (QTL) control pear-shaped fruit development in both tomato and eggplant. It encodes a previously uncharacterized class of regulatory genes important for plant development and functions as a plant-growth suppressor.

Nowadays comparative and functional genomics apply new idea and advanced technique flat for research of multiple gene traits. The research on QTL gene will promote cultivation and exploiture of wild solanaceous species and further improve other economically important crops. Functional comparison of orthologous genes in closely related solanaceous species could be extended to other crops.

#### Material and method

Eggplant and tobacco wild-type plants, eggplant 77P17 BAC, tobacco genome database, *ovate* gene sequences from tomato BAC19 and potato, pepper, petunia *ovate* orthologous sequences are collected.

In the beginning bioinformatics methords were used, then we did southern hybridization, molecular clone, PCR, RACE experiments and so on. We applied statistical and phylogenetic analyse experiments results to obtain better evolutional relationship in solanaceous species at last.

## **Results I**

#### Obtain ovate orthologous sequences from tobacco and identify two copies



Fig 1. Tomato *ovate* DNA blast tobacoo genome database, find *ovate* orthologous sequences and assemble two contigs

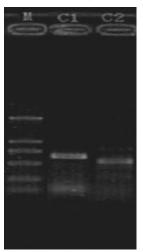


Fig 2. Two pairs of gene special primers PCR amplify tobacco genome DNA, indentify two copies

# **Results II**

Obtain ovate orthologous sequences from eggplant

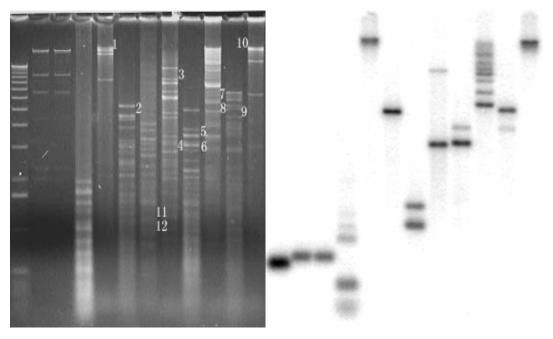
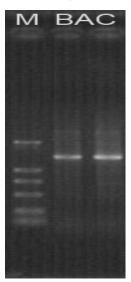


Fig 3. Tomato ovate DNA probe southern hybridize eggplant 77P17 BAC, find ovate orthologous

sequences

	10	20	30	40	50	60	70	80	90	100
		less <u>alissal</u>								1
6.27I18.5 CDNA	ATGGGAAAAAGTT	CAAGCTTCGGT	TCTCCAGAGT	TATTGCTTCT	ITCAATTCCT	GCCGTTCCAA	AGACACGTCT	TCTCTTCCCC.	AAAATCCTAA	ATTTCT
6.BAC19.6 cDNA	ATGGGAAAAAGTT	GAAGCTTCGGT	TCTCCAGAGT	TATTGCTTCT	ITCAATTCGT	GCCGTTCGAA	AAACCCTTCT	TCTCTTCCCC.	AAAATCCTAA	ATTTCT
6.215H17.5 cDNA	ATGGGAAAAAGTT	GAAACTTCGTT	TCTCCAAAGT	TATTGCTTCC'	<b>TTCAATTCTT</b>	GCCGTTCCAA	AGAGCCTTCT	TCTCTTCCCC.	AAAATCCTAA	ATTTCT
6.At2g18500 CDS	ATGACGAAACGTT	CAAATTAAAGA	TTTCAAGAAT	CCTCTCA	TCAAATCTT	GCCGTTTAAA	AGATCCTTCT	TCTCTTCCTT	TTAATCCTG	TTTCT
Clustal Consensus	*** *** ***	* ** *	* ** * * *	* **	**** ** *	***** **	* * * ***	*******	*****	****
	110	120	130	140	150	160	170	180	190	200
	110	120	1.30	140	100	100	10	100	190	200
6.27118.5 [cDNA	TCCCACATAAGCT	CTACTACAAA	ACTCATTTAA	CCCGATTTCC	TOTTATOCA	TCAAAATCAA	AATCAAAATC	ACCGTAATTA	CATCOCCA	TCCAT
6.BAC19.6 cDNA	TCCCACATAAGCT			1.5.5 (115 States)	N 7 N 10 N N					1 1 2 2 2 2 2 2
6.215H17.5 cDNA		CAC-ATAC	ACACATITICC	CCCGAILICC		T-AATAGTAA		TA-TA		ATCCA-
6.At2g18500 CDS		CCGACGTAC				TTAACTCCTC	T. T. C. 1997 T	A CONTRACTOR OF		IGCCGC
Clustal Consensus	ICAAGI CIC	***				* **	COCCOACOIC	ACCA-		JULUU
Clustal Consensus						* **				**
	910	920	930	940	950	960	970	980	990	1000
C 07710 EL-DW					- COLU					
6.27I18.5 cDNA	AAATGTTTGAGAA				5 - 50 - 10 - 40 - 60 - 60 - 60 - 60 - 60 - 60 - 6	(a) - (a) 277 (b) 747 (b) (c) 6 (b)				
6.BAC19.6 cDNA	AAATGTTTGAGAA			Contraction of the second	100 C 100 C 100 C			19 C 2 C 10 C 10 C		
6.215H17.5 cDNA	AAATGTTTGAGAA					100 C 100			220 T T T T T T T	Real Providence
6.At2g18500 CDS	AGATGTTTGAAGT	AGCTGAGCTTG	AACAGCTTCT	TAGTTGCTTC	CTATCGCTAA	ACGCGAAACG	CCACCACCGC	GCGATTGTAA	GAGCGTTTTC	CAGAGAT
Clustal Consensus	* *******	*****	* ****** *	** **	** *** * *	*** ** *	* ** *	* *** **	** ** **	* ** **

Fig 4. Multiple alignment of the known ovate homologous sequences and design a pair of



degenerate primers

Fig 5. Degenerate primers PCR amplify eggplant 77P17 BAC,

get ovate orthologous sequences

**Results III** 

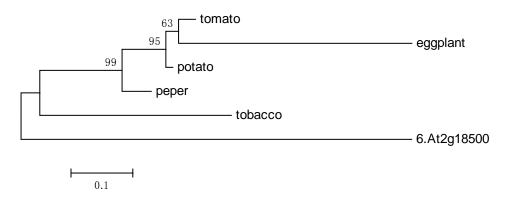


Fig 6. Phylogenetic trees of analyses of ovate orthologous sequences in six species