Stress-responsive miRNAome of Glycine max (*L*.) *Merrill: molecular insights and way forward*

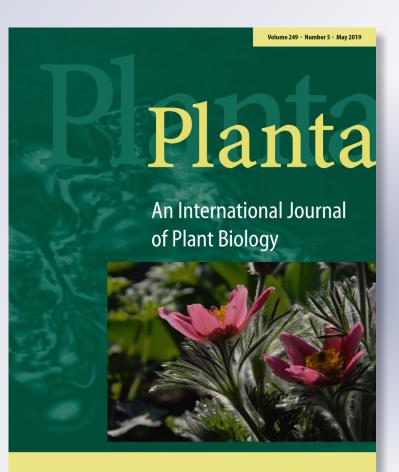
S. V. Ramesh, V. Govindasamy, M. K. Rajesh, A. A. Sabana & Shelly Praveen

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Stress-responsive miRNAome of *Glycine max* (L.) Merrill: molecular insights and way forward

S. V. Ramesh^{1,2} · V. Govindasamy³ · M. K. Rajesh² · A. A. Sabana² · Shelly Praveen³

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Abstract

Main conclusion Analysis of stress-associated miRNAs of *Glycine max* (L.) Merrill reveals wider ramifications of small RNA-mediated (conserved and legume-specific miRNAs) gene regulatory foot prints in molecular adaptive responses.

MicroRNAs (miRNAs) are indispensable components of gene regulatory mechanism of plants. Soybean is a crop of immense commercial potential grown worldwide for its edible oil and soy meal. Intensive research efforts, using the next generation sequencing and bioinformatics techniques, have led to the identification and characterization of numerous small RNAs, especially microRNAs (miRNAs), in soybean. Furthermore, studies have unequivocally demonstrated the significance of miRNAs during the developmental processes and various stresses in soybean. In this review, we summarize the current state of understanding of miRNA-based abiotic and biotic stress responses in soybean. In addition, the molecular insights gained from the stress-related soybean miRNAs have been compared to the miRNAs of other crops, especially legumes, and the core commonalities have been highlighted, though differences among them were not ignored. Nature of response of soybean-derived conserved miRNAs during various stresses was also analyzed to gain deeper insights regarding sRNAome-based defense responses. This review further provides way forward in legume small RNA transcriptomics based on the adaptive responses of soybean and other legume-derived miRNAs.

 $\textbf{Keywords} \ Conserved \ miRNAs \cdot Gene \ regulation \cdot Legumes \cdot miRNA \ evolution \cdot Non-coding \ RNAs \cdot Soybean \cdot Stressors$

Abbreviations		HESO1	HEN1 SUPPRESSOR1
AGO	Argonaute	HST1	HASTY 1
AM	Arbuscular mycorrhiza	HYL1	HYPONASTIC LEAVES1
AP2	APETALA 2	miRNAs	MicroRNAs
ARF	Auxin response factor	nat-siRNAs	Natural antisense transcript siRNAs
ASR	Asian soybean rust	NGS	Next generation sequencing
DCL-1	Dicer-like-1	PEGs	Protein encoding genes
DRE	Dehydration responsive element	PTGS	Post transcriptional gene silencing
ENOD93	Early nodulin 93	RBPs	dsRNA-binding proteins
GSS	Genome survey sequence	RdDM	RNA-dependent DNA methylation
hc-siRNAs	Heterochromatic siRNAs	RISC	RNA-induced silencing complex
HEN 1	HUA enhancer 1	SCN	Soybean cyst nematode
		SE	SERRATE
S. V. Ramesh ramesh.sv@icar.gov.in		siRNAs	Small interfering RNAs
		SMV	Soybean mosaic virus
¹ ICAR-Indian Institute of Soybean Research (ICAR-IISR),		sncRNAs	Small non-coding RNAs
		SNF	Symbiotic nitrogen fixation
	lhya Pradesh 452001, India	TFs	Transcriptional factors
	ral Plantation Crops Research Institute	TGS	Transcriptional gene silencing

ICAR-Indian Agricultural Research Institute (ICAR-IARI), New Delhi 110012, India

(ICAR-CPCRI), Kasaragod, Kerala 671124, India