

# "Weirdo" mutant plant opens doors for food security

June 15 2015, by Cristy Burne

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Nicotiana growing next to ancient Aboriginal petroglyphs on a mountainside in the northern interior of Western Australia. Credit: Steve Wylie

The discovery that an Australian tobacco plant studied internationally as part of plant breeding programs is actually the genetic "weirdo" of its family holds huge potential for food security, experts say.

Susceptible to infection by more than 500 plant viruses, Nicotiana

benthamiana is the plant of choice for studies in plant virology and foreign [gene expression](#).

But research by Murdoch University's Dr Stephen Wylie and colleagues shows the lab strain of *N. benthamiana* is the exception, not the rule.

Dr Wylie's team collected 23 strains of wild *N. benthamiana* in northern WA, comparing their response to viral infection with that of the single-source lab strain.

"It was always a puzzle why *N. benthamiana* is so unusually susceptible to viruses; that should place the species on a fast track to extinction. Now the puzzle is solved," Dr Wylie says.

"The lab strain has a weird mutation in its RDR1 gene, making it respond with more severe symptoms to some virus infections," he says.

"The wild strains have a functional RDR1, and respond with much milder symptoms."

*N. benthamiana* is related to valuable crop species including the potato, tomato, capsicum and eggplant, so the finding has direct implications for [food security](#), Dr Wylie says.

The discovery means many plant studies have been conducted on a *Nicotiana* strain that not only responds atypically to viruses, but most likely experiences other genetic abnormalities as well.



*N. benthamia* near Karratha in the Pilbara. Credit Steve Wylie

"The RDR1 gene controls many developmental processes in the plant,

responding to viruses is just the tip of the iceberg," Dr Wylie says.

"There's a whole suite of other valuable genes in these Australian tobaccos; the plant's ability to thrive in the range of dry, hot and salt-laden environments means it has genes needed for sustainable agriculture."

As part of his research, Dr Wylie's team amassed the world's largest collection of Australian *Nicotiana* species, and he is already receiving requests for seed.

"We have salt-tolerant *N. benthamiana* lines that live right on the seashore, and drought-tolerant ones that come from desert mountains, plants with widely different talents," he says.

"This collection of plants is going to be a valuable tool for plant breeders and physiologists into the future.

"Given that climate change is real, and that the climate's getting drier and hotter, it's really important to identify genes that will help crops survive future challenges," Dr Wylie says.

"Where better to look than in the tough, indigenous [plants](#) of Western Australia?"

Provided by Science Network WA

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