

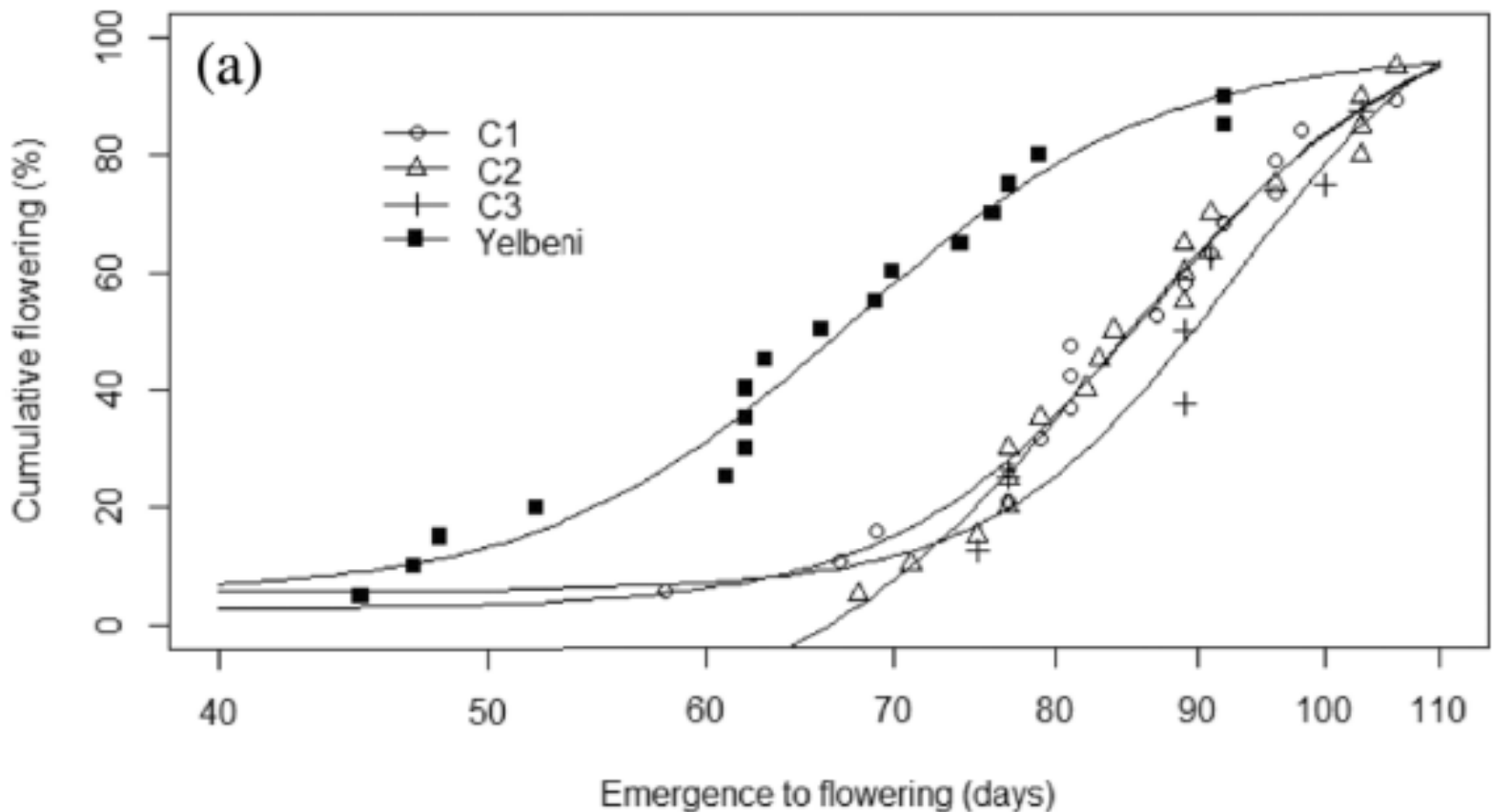
Ashworth et al. 2024 reported that a Western Australia wild radish population has evolved an early shedding trait to persist despite long term HWSC use. The wild radish population changed to only flower 6 days earlier than control populations. The wild radish population changed to only flower 6 days earlier than control populations. The population also changed its lowest seed location to be below the lowest height for harvest interception (10 cm), which is likely to increase HWSC evasion. The mechanism inducing early shedding is yet to be determined; however, wild radish is known for its significant genetic variability and has demonstrated its capacity to adapt to environmental and management stresses.

TESTING PROCESS

This study demonstrates that the repeated use of HWSC can lead to the selection of HWSC-avoidance traits including early silique-shedding before harvest and/or locating siliques below the harvest cutting height for interception.

Newly released research by Virginia Tech evaluates the potential for Palmer Amaranth to change so that it is no longer susceptible to HWSC. Mechanisms that can alter HWSC could include increased seed shatter, more seeds below harvest height and changes in flowering timing.

Thirty plants for each population study were transplanted in green houses and common gardens to evaluate the possibility of palmer amaranth evading HWSC in the future. The plants that changed the most were selected for further breeding. As seen below significant changes in flower timing were made in just 2 or 3 generations.



RESULTS

Researchers were able to reduce palmer amaranth flowering timing by 41 and 54 days in just 3 generations in the greenhouses. In the field, flowering time was reduced by 5.5 and 8.9 days in two generations.

With HWSC research and adoption increasing globally to control multiple herbicide resistance-prone species, it is imperative to protect HWSC through the implementation and integration of crop rotations and pastures, herbicide rotation, increased crop competition and the diversification of weed seed set reduction techniques.

Adaptation of wild radish in Western Australia to try and beat HWSC just shows how effective HWSC has become!

DIFFERENCES IN HEIGHT AND WEIGHT

Species	Height difference (cm)	Generations selected	Setting	Timing	Source
Wild Radish	55	5	Greenhouse	At first flower	Ashworth et al. 2016
Palmer amaranth	65.4 and 42.2	3	Greenhouse	At first flower	
Palmer amaranth	24.7 and 11.0	2	Common garden	At first flower	
Palmer amaranth	30.8 and 0.6	2	Common garden	Final height	

Species	Weight difference (g)	Generations selected	Setting	Timing	Source
Wild Radish	18	5	Greenhouse	At first flower	Ashworth et al. 2016
Palmer amaranth	617 and 539	2	Common garden	Final weight	

REDUCTION IN FLOWERING TIME

Species	Flowering time difference (days)	Generations selected	Setting	Source
Wild Radish	30	5	Greenhouse	Ashworth et al. 2016
Wild Radish	22 and 19	>20	Common Garden	Ashworth et al. 2024
Palmer amaranth	41.0 and 54.7	3	Greenhouse	
Palmer amaranth	8.9 and 5.5	2	Common Garden	