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Variation in β-amylase activity and thermostability in Tibetan annual wild and cultivated barley genotypes

Key words: Barley, β-Amylase activity, Thermostability, Tibet

Research Summary

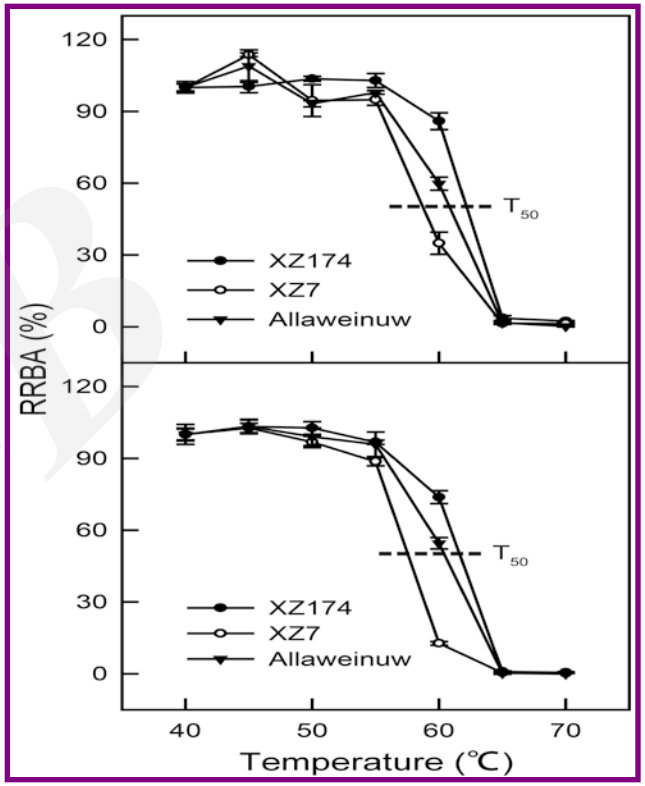
In this study, 138 Tibetan annual wild barley accessions and 20 cultivated genotypes were analyzed. The cultivated barley had a mean BAA of 1137.6 U/g, ranging from 602.1 U/g to 1407.5 U/g, while the wild barley had a mean of 1517.9 U/g, ranging from 829.7 U/g to 2310.0 U/g. For relative residual *β*-amylase activity (RRBAT) , an indicator presenting BAT, The cultivated barley a mean of 61.6%, ranging from 22.2% to 82.3%, and the wild barleys had a mean of 57.8%, ranging 21.9 % to 96.1 %. A significant difference was detected among genotypes in the response of RRBAT to the temperature and duration of heat treatment.

BAA and BAT in Tibetan wild and cultivated barleys

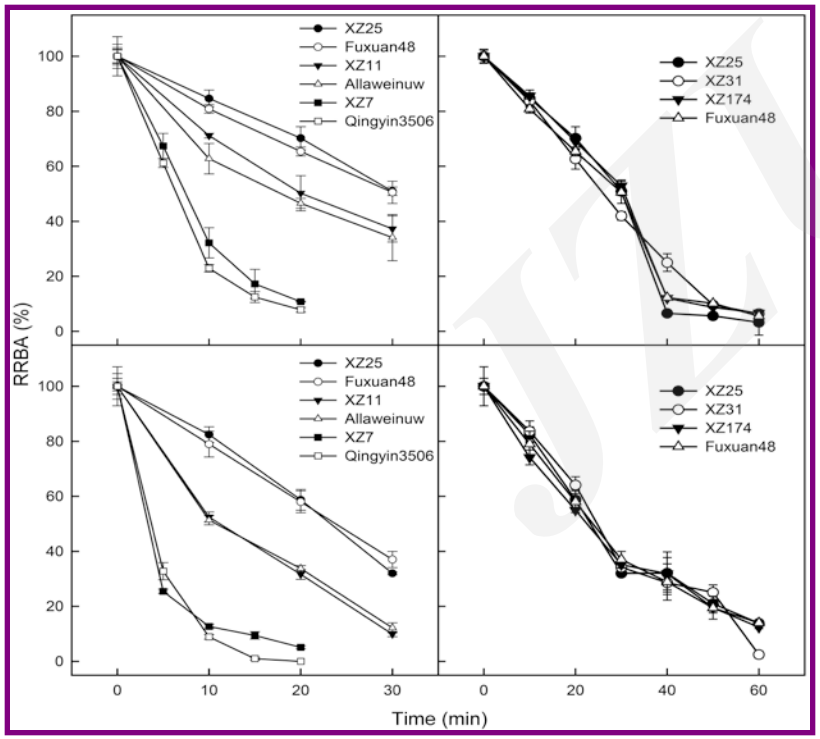
		BAA (U/g)		BAT (%)	
		Wild	Cultivated	Wild	Cultivated
2009	Min	829.7	602.1	21.9	22.2
	Max	2310.0	1407.5	96.1	82.3
	Mean	1517.9	1137.6	57.8	61.6
	CV[d] (%)	22.8	18.5	24.6	31.6
2012	Min	624.0	780.0	3.4	12.3
	Max	1913.1	1323.2	87.4	80.7
	Mean	1315.4	1030.8	38.4	38.4
	CV (%)	23.5	16.4	50.7	60.1

Innovative points

- Tibetan annual wild barley had a wider variation in BAA and BAT than cultivated barley.
- The wild barley accessions with high BAA and BAT were identified and characterized.
- Genotypic difference was detected in the responses of BAA to temperature and the time of heat treatment.



The change in RRBAT with temperature. Top, 2009; bottom, 2012. T50 refers to the temperature when RRBAT is 50%.



The change in RRBAT with time. β-amylase extract of each genotype was incubated at 60 ° C for 30 min (left) or 60 min (right).