History to blame for slow crop taming, study says

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It's been about 10,000 years since our ancestors began farming, but crop domestication has taken much longer than expected – a delay caused less by genetics and more by culture and history, according to a new study co-authored by University of Guelph researchers.

The new paper digs at the roots not just of crop domestication but of civilization itself, says plant agriculture professor Lewis Lukens. "How did humans get food? Without domestication – without food – it's hard for populations to settle down," he said. "Domestication was the key for all subsequent human civilization."

The study appears this the current issue of the *Proceedings of the National Academy of Sciences.*

Lukens and Guelph PhD student Ann Meyer worked on the study with biologists at Oklahoma State University and Washington State University.

Examining crop domestication tells us how our ancestors developed food, feed and fibre leading to today's crops and products. Examining crop genetics might also help breeders and farmers looking to further refine and grow more crops for an expanding human population.

"This work is largely historical, but there are increasing demands for food production, and understanding the genetic basis of past plant improvement should help future efforts," he said.

The Guelph team analyzed data from earlier studies of domesticated cereal crop species, and the American scientists also performed field tests.

To study the historical effects of interactions between genes and between genes and the environment, they looked at genes controlling several crop plant traits.

Domestication has yielded modern crops whose seeds resist shattering, such as corn whose kernels stay on the cob instead of falling off. Early agriculturalists also shortened flowering time for crops, necessary in shorter growing seasons as in Canada.

Domestication traits are known to have developed more slowly than expected over the past 10,000 years. The researchers wondered whether genetic factors hindered transmission of genes controlling such traits. Instead, they found that domestication traits are often faithfully passed from parent to progeny, and often more so than ancestral traits, said Lukens.

That suggests cultural and historical factors – anything from war and famine to lack of communication among separated populations – accounted for the creeping rate of domestication.

"We conclude that the slow adaptation of domesticated plants by humans was likely due to historical factors that limited technological progress," said Lukens.

Provided by University of Guelph