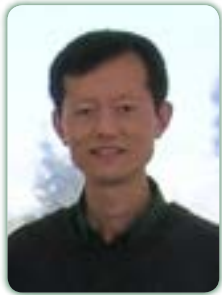


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Beiquan Mou

U.S. Dept. of Agriculture, USA

Genetic improvement of nutritional value in lettuce and spinach

Lettuce (*Lactuca sativa*) is the most important vegetable crop produced for fresh market in the United States in terms of acreage, production, and market value. Crisphead lettuce has much lower contents of vitamins and minerals than leaf or romaine lettuce. Our research suggests that the lower nutritional value of crisphead lettuce is due to the enclosure of its leaves in the head structure. Spinach (*Spinacia oleracea*) is called “superfood” due to its high contents of beta-carotene (pro vitamin A), lutein, folate, vitamin C, calcium, iron, phosphorous, and potassium. Spinach is also known to have a large amount of oxalic acid, which may combine with minerals to form insoluble oxalate crystals thus reducing the bioavailability and absorption of minerals and depositing in the kidneys of certain people as a common form of kidney stone. Elevating the nutritional levels of vegetables would improve the nutrient intake without requiring an increase in consumption. A breeding program to enhance the nutritional quality of lettuce and spinach must start with an assessment of the existing genetic variation. We found significant variation among and within different types of lettuce and spinach in concentrations of vitamins, minerals, and oxalic acid, which is also influenced by the environment and the moisture content of the plant. Beta-carotene, lutein, and chlorophyll concentrations are highly correlated in lettuce, suggesting that carotenoid content could be selected indirectly through chlorophyll or color measurement. We are conducting research on molecular marker assisted selection and breeding to improve the nutritional value of lettuce and spinach.

Biography

Beiquan Mou is a Research Plant Geneticist with the USDA-ARS. He obtained his Ph. D. degree in plant breeding and genetics from Oregon State University and completed postdoctoral training at Iowa State University. Dr. Mou conducts research on the genetics and breeding of lettuce and spinach including nutritional improvement. He has published more than 70 peer-reviewed journal articles and released 35 lettuce and spinach varieties and genetic stocks possessing unique traits, new genes, disease or insect resistance, and/or improved quality. He currently serves as chair of the USDA Leafy Vegetable Crop Germplasm Committee and Consulting Editor of HortScience journal.

beiquan.mou@ars.usda.gov

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