BARLEY CAP

facts

Marker-Assisted Selection

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What is Barley CAP?

Coordinated Agricultural Project for Barley

Funded by the USDA/CSREES, Barley CAP is a community of 30 scientists from 19 institutions with wide ranging expertise. Their primary focus is to use new genomic information to speed the breeding of superior barley varieties.

What Is Marker-Assisted Selection or MAS?

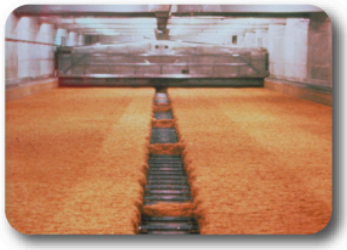
Genetic markers, used in MAS, act like chemical flags indicating a particular genetic trait is in a plant. Breeders use markers when traits are not easily observed. Using genomic information, an index can be made and used to determine where specific information in a plant is. Finding markers without genomic information is like looking through an encyclopedia that is not alphabetized and has no index

Why Would Breeders Use MAS?

Breeders use MAS to find out quickly what genetic information is in a particular plant. This allows them to easily select plants with desired traits. For breeders, being able to use markers is like using a familiar landmark, like a well-known restaurant, to know that you are close to your home.

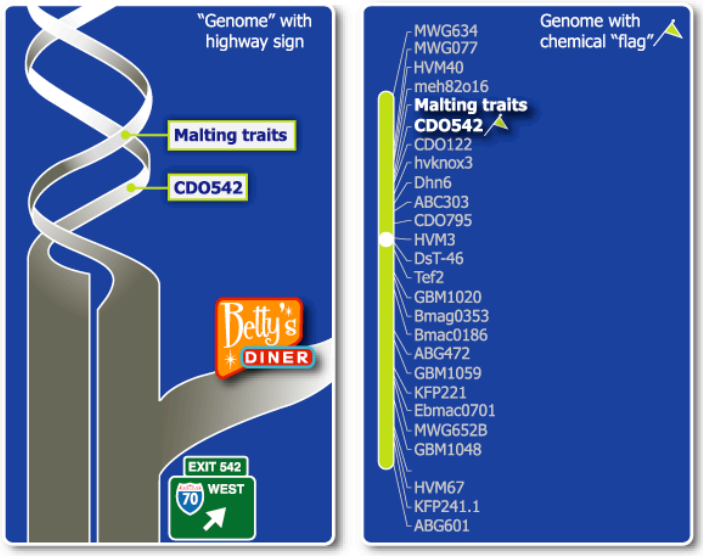
What Are the Benefits of MAS?

Markers let breeders screen large populations of plants quickly to select plants with a high likelihood of having a specific trait, even if the trait can't be easily seen in the plant in the field – like malting quality or disease resistance when the actual pathogen is not present. Because of its speed and accuracy, MAS can dramatically speed classical breeding efforts.



How Marker-Assisted Selection Helps Breeders

Having markers in the genome for breeders is like having highway signs for drivers.



When Can MAS Be Used?

To use MAS, a genetic index is needed that indicates where certain traits are in the genome. Additionally, a chemical marker must be found close to the trait of interest. Markers are then used to screen populations and, if they are present, it is likely the desired trait is there also. Let's say marker CDO542 on chromosome 4H is close to malting quality traits. That marker can be used to screen plant populations and, when a plant has the marker, its grain likely has higher malting quality.

What is Barley CAP doing with MAS?

Barley CAP researchers are identifying markers to improve existing barley cultivars by screening large plant populations from crosses of different varieties. They then establish an index of useful markers and use that information to develop varieties with traits of interest. Examples in progress include pyramiding multiple sources of resistance to barley strip rust, creating high β-glucan winter barley for human food, introducing resistance to Fusarium head blight and Septoria speckled leaf blotch and moving genetic regions for higher yield from feed barley into malting cultivars.

To see more fact sheets, please visit
http://barleycap.cfans.umn.edu/outreach.htm

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