Possible Solution

A

Scientists discovered a gene silencing technique to turn off the expression of polyphenol oxidase. This plant enzyme causes a chemical reaction when cells are damaged resulting in brown melanin. By suppressing this gene, no polyphenolics are produced and no browning occurs.

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Possible Solution

B

Scientists discovered a gene sequencing technique using similar wild plant species RNA to suppress natural enzymes. The gene sequence from wild plant species is so similar that the domesticated version easily recognizes it. This means that bruising can be reduced by up to 40%.

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Possible Solution

C

Scientists use a process called transformation to copy traits from one organism and insert them into another organism's cell. By copying a protein from a virus and inserting it into the seed of a fruit, the fruit becomes resistant to that virus.

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Possible Solution

D

A naturally occurring soil bacterium — Bacillus thuringiensis (or Bt) — produces a protein that is toxic to caterpillars but safe for other insects and other animals like mammals, birds and fish. Scientists can insert the gene from the Bt into a plant's genetic code and the plant can produce the protein that is toxic to the caterpillars.

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Possible Solution

E

Many farmers spray glyphosate to control weeds. Glyphosate kills plants by interfering with their ability to produce essential amino acids. Using a gene gun scientists can insert germplasm from a bacterium into seeds so that they can still produce the amino acids. Then when glyphosate is sprayed it kills the weeds but leaves the desired crop.

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Possible Solution

F

Some varieties of a plant are more salt tolerant than other varieties. But those salt tolerant varieties don't produce as much. Scientists are working on recombinant DNA that will inter-mate salt tolerant plants with high producing varieties. This will hopefully yield a high producing, salt tolerant variety.

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Possible Solution

G

Scientists crossed a high-yielding American variety with a dwarf Japanese variety. This created a semi-dwarf variety that is 1/2 the height and can produce thick stems. The thick stems can hold more heads of grain per plant. The semi-dwarf variety was then crossed with disease-resistant varieties to add those traits.

Possible Solution

H

Many fruits and flowers that are orange produce beta-carotene and is necessary to produce vitamin A. Scientists added two genes (one from a grass and one from a bacterium) to turn on the production of carotenoids. The resulting grain was golden in color and produced beta-carotene.

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