Mutation breeding and gene editing

What is mutation breeding and how does it relate to gene editing?

Mutation breeding is the process of exposing seeds to chemicals, radiation, or enzymes in order to generate random mutations. Crop breeders can induce many random mutations and then select the most useful mutations for future cross-breeding rather than waiting for multiple generations for those mutations to occur on their own.

Mutation breeding has been used by plant breeders world-wide since the discovery in the 1920s, and is usually listed as a 'conventional breeding technology' in regulations (including in the UK).

Proponents of gene editing say that as mutation breeding involves changes to the gene, it is not different from gene editing technologies. Since a large proportion of our food is created this way, gene editing should be allowed in the food supply chain.

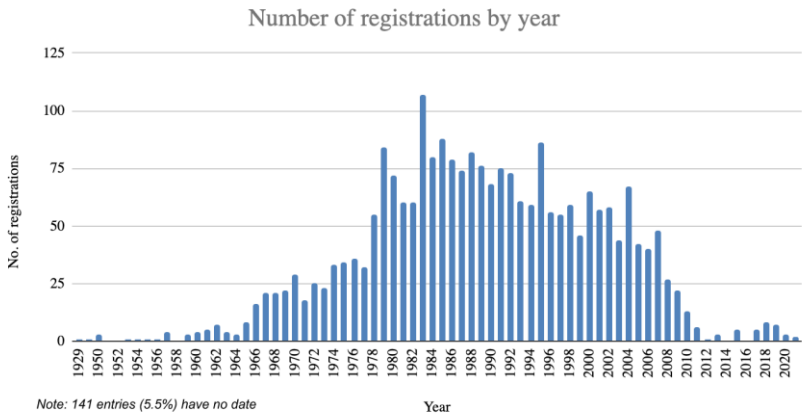
Mutation breeding is not proven to be safe

Since it has been around since the 1920s, mutation breeding has never been subject to the same safety assessments that modern techniques are. This does not mean it is safe. In fact, experts have noted the high risk of producing unintended effects from mutation breeding.[1]

Without subjecting mutation breeding to a comprehensive risk assessment, it is a fallacious argument to say that gene editing should be regulated as mutation breeding on the grounds that mutation breeding must be safe.

Mutation breeding is unpopular

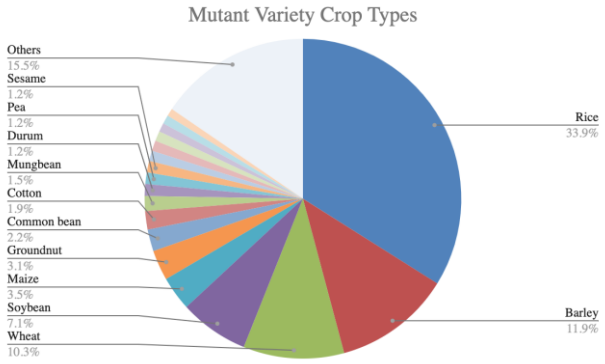
Probably mainly due to the unreliability of the technique, mutation breeding has become less popular in recent decades. The graph below shows that mutation breeding had its heyday in the 1980s and 1990s, with registrations tailing off from the mid-2000's onwards.



Source: FAO mutant variety database

Moreover, more than half of mutant registrations have been focussed on just 3 crops – rice, barley and wheat.

Therefore it is just not true to say that a large proportion of the food we eat was produced this way.



Source: FAO mutant variety database

[1] https://nap.nationalacademies.org/read/10977/chapter/5#62