

Crop uniformity: The key to salad onion success

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Abstract

Crop uniformity underpins marketable yields for many field vegetable crops. Unlike grain crops, which are bulked together at harvest, field vegetables tend to be marketed as either individual whole plants or components of plants (e.g. lettuce heads, carrot roots, Broccoli florets) which must meet strict quality specifications demanded by retailers and consumers. Increasing levels of crop variability results in fewer plants meeting the necessary quality criteria, reducing marketable yields and creating greater levels of waste.

Edible Allium species such as garlic, onions and leeks are globally important crops that have been cultivated since ancient times. Salad onions (either *A. cepa* or *A. fistulosum*), also commonly known as spring onions and scallions, are consumed across the world for their immature bulbs, fleshy leaves and pungent flavour. Salad onions are a high value crop (£16,041/ha) ranking as the 7th most valuable UK field vegetable crop in terms of value per hectare in 2018 (DEFRA). In the UK salad onions are directly sown during the spring and summer in order to be harvested throughout the summer months. Outside of the UK growing season a consistent year-round supply is maintained primarily through the import of produce from North and West Africa.

G's Growers, one of Europe's largest vegetable and salad suppliers, produce salad onions in the UK and Senegal for the UK market. Over recent years they have begun to identify notable crop variability across their production sites. Plants are seen to vary in size and growth at both plant-to-plant and field spatial levels leading to highly uneven crops. This variability can have a negative impact on marketable yields, increase crop wastage and ultimately reduce profits. The precise causes of this variability however have yet to be identified and continue to pose a problem for growers.

This project aims to increase our knowledge of how various factors may influence salad onion growth and development and begin to identify the possible causes of crop variation currently being witnessed in commercial production. An improved understanding of what contributes to irregular and variable salad onion growth may provide invaluable opportunities for growers to implement changes that will facilitate maximal yields and minimise inputs and waste.

Monitoring trials have been conducted across a number of commercial UK salad onion crops during summer 2018 and 2019, assessing a range of variables in order to describe the crop variability that exists and begin to identify possible causes. In-field spatial crop variability was seen across a number of monitoring trials to varying degrees. Soil moisture, soil strength and sowing depth were all seen to possess a relationship with crop performance within some of the monitoring trials. These factors are of particular importance to early crop development, suggesting that this phase may be a key period in which variation may be introduced to salad onion crops.

In-field monitoring has highlighted crop establishment as being an important phase requiring further study. Controlled environment experiments, as well as field trials, are now being planned to unpick

how various factors such as seed quality, sowing depth and soil traits may influence early plant establishment and marketable yields.