BRITISH TOMATO GROWERS' ASSOCIATION

RESEARCH AND DEVELOPMENT PRIORITIES

Produced by the British Tomato Growers' Association Technical Committee

british
Tomato Growers' Association
www.britishtomatoes.co.uk

Introduction

British Tomato Growers need high quality pure and applied research to help them to;

- **sustain and improve the profitability and competitiveness of their businesses**
- **optimise inputs, improve quality and yields and reduce waste**
- **continue adoption of environmentally sensitive and sustainable systems**
- **differentiate the premium quality of British products for customers and consumers**
- **meet statutory and customer expectations in every respect**

Effective research and knowledge exchange will enable the UK industry to remain at the forefront of global advances in the technologies and practises to ensure sustainability and expansion of British Tomato production. We aim to stay one step ahead of current issues and improve the sustainability of every operation undertaken whether in production, packing, sales or marketing.

The British Tomato Growers Association (BTGA), representing over 95% of the British Tomato industry (approximately 190ha), principally requires solutions to the cultural and practical problems shared by all growers, using science and technology which is understood by and acceptable to consumers. The BTGA also wish to encourage novel and speculative research which will drive their long-term innovation agenda. Such solutions include those to the current problems whether in terms of pest and disease, energy, water, environmental sustainability, equipment and automation, labour or any other of a number of issues which have been, are, and will continue to be faced in the future.

The process requires ongoing development and implementation of best practice from currently available technology and the incorporation of knowledge provided by new research that has been directed by the specific requirements of the industry though may also evolve from unexpected areas of seemingly unrelated disciplines outside horticulture. The Association feel it is critical to be involved with a diversity of research at all levels to ensure outcomes have a direct practical commercially beneficial application. The group are keen to engage, partner and participate with research organisations and funding bodies to get best value from all streams of research work. Effective knowledge exchange with the whole industry is also a key need. Moreover, the BTGA also hope to encourage young entrants, at all levels, into Tomato production to help assure the sustainability and ongoing vibrancy of this innovative industry.

The current strategy has been developed by the BTGA technical committee consisting of growers, industry experts, consultants, researchers and funding representatives. It is thus believed that the document is an authoritative and well considered text which is commended to members and the research community at large in the hope that these ideas will stimulate a dialogue between; funding organisations, service providers and the grower community in the UK, to ensure a successful and sustainable future for British based tomato production.

To illustrate the industry needs, the tomato production cycle has been used as a base, with R&D and knowledge transfer requirements highlighted in each phase through production to postharvest. Targets and timeframes have been set; strategies which may help deliver these have been suggested. The BTGA would like to request that stakeholders consult with the technical committee (via their Technical Officer) prior to considering addressing any of the issues presented in this document. Additional ‘risk register’ documents are also used alongside this core document to further disseminate and prioritise research needs.

The BTGA top priorities are:

1. **To improve profitability by increased production efficiency through better use of resources, education and investment in developing automation**
2. **Maintain and develop preferred supplier status with customers through differentiation of Premium British quality**
3. **To reduce losses caused by pest and diseases using ICM techniques and without recourse to Plant Protection Products wherever possible**
4. **Continue to develop more environmentally sensitive and sustainable systems**
5. **To inspire the next generation of industry experts to choose protected horticulture as a rewarding career pathway.**
6. **To inform consumers of the significant benefits of the inclusion of tomatoes as part of a healthy balanced diet**

Tomato Crop Cycle

Seeds and Cultivars

Targets

- The development of naturally developed cultivars which require less production inputs (e.g. can be grown at lower temperatures, are more efficient at photosynthesising, have a structural architecture that is more favourable for automation and/or labour reduction).
- The development of cultivars which have a higher nutritional value, improved organoleptic and aesthetic qualities and deliver the best consumer experience ensuring customers seek our British tomatoes in preference to imported produce.
- The development of cultivars which have a wider range of pest, disease resistances to further assist in the overall aim of being a pesticide free industry.
- The development of bespoke UK specific (conventional and organic) cultivars.
- New Product Development.

Strategies

- Facilitate consultation with seed houses to stimulate interest in TGA Targets in this area.
- Keep up to date with novel plant breeding technologies.

- Link in with current research and technologies to benchmark and continually measure the differentiating characteristics of British tomatoes including nascent research on optimising the nutraceutical value of tomato fruits nutritional constituents

Inputs

Targets

- Maximise the efficient and sustainable use of all crop inputs through setting aspirational targets, measuring our industry achievements and regularly reviewing progress towards these goals.
- Achieving a truly sustainable environmentally friendly and carbon neutral system.
- It should be noted that British growers have, during the last 15 years, made significant progress in all aspects of reducing, re-using, recycling and optimising the use of all crop inputs (including natural resources) and achieving efficiency of use with respect to all crop inputs and recognise that, as new technologies and systems evolve, ongoing progress is still achievable in this respect

Strategies

- Desk studies and access to information/resources to establish best practice and innovation in this and other sectors which are directly and indirectly applicable
- Conduct applied and theoretical research to establish if outputs from the desk studies/information gathering have potential on BTGA member holdings.
- Identify parameters which limit aspects of fruit quality and investigate methods by which greater control can be exerted, including the aerial and root zone environment, biome quality, bespoke cultivar nutritional regimes etc.
- Development of new growing systems using techniques and equipment which may redesign the way crops are grown.

- **Energy**
  - Continue to investigate alternative and renewable energy streams such as waste heat from other industries.
  - Continue to improve efficient use of energy (glasshouse design and thermal screen technology etc)
  - Gather evidence to support policy and planning regulations to help growers make better use of waste heat.
  - Horizon scan, awareness of and influence ongoing developments in energy Policy where such developments may have a significant impact on our industry.
- **Labour**
  - Develop strategies to improve motivation and participation in our businesses of staff at all levels to ensure we attract the best talent and ensure a sustainable future for the British Tomato industry at this fundamental level in respect of succession planning and staff retention ensuring horticulture is seen as an attractive and profitable career path.
  - Identify appropriate ergonomic solutions to crop husbandry and harvesting activities and develop best practice in these areas.
  - Progress options for automation of some tasks.
- **CO_2**
  - Data mine/model/research ways of reducing CO_2 input with consideration for specific tomato types.
  - Target CO_2 input to more accurately follow plant demand.
  - Develop alternative sources of CO_2 in preparation for fossil fuel free production.
- **Nutrients**
  - Update existing nutrient efficiency and supply models to suit modern Tomato cultivars.

  - Improve understanding of nutrient uptake and research efficient use of nutrients in soil and hydroponic systems.
  - Optimisation of the re-circulation of nutrients in hydroponic systems
- **Water**
  - Investigate methods to reduce water usage without compromising plant health and fruit quality.
  - Develop purification systems for the safe re-use of waste and rain water supplies.
- **Light**
  - Provide technical and economic solutions on supplementary and 'All Year Round' (AYR) lighting technologies.
  - Continue to research applicable new lighting technologies to enable rapid uptake where benefits are economically viable.
- **Substrates**
  - Optimisation of the root zone environment and the relationship between plant and rhizosphere microbial populations.
  - Development of improved and novel substrates.

Crop protection

Targets

- To achieve the optimum economic level of pest and disease control through better understanding of and working with the glasshouse ecosystem.
- To ensure the availability of a comprehensive and effective range of natural biological solutions available.
- To reduce the use of non-biological Plant Protection Products.
- To encourage innovation in safe Biological Plant Protection Products development for Tomato production.
- To anticipate where the potential vulnerabilities are and will be in the future regarding the control of existing and novel Pest and Diseases through proactively planning contingency, horizon scan and monitor for new pests and diseases and ensure that products available meet current and future threats.

Strategies

- Research to improve Integrated Pest Management (IPM) and Integrated Glasshouse Management (IGM) to reduce the economic impact of existing pests and diseases.
- Horizon scan for potential crop protection threats and opportunities through stimulating research where gaps in knowledge exist.
- Develop complimentary contingency plans for potential new threats.

Cropping systems

Targets

- To discover and implement the latest developments in labour use, automation and engineering.
- Optimise cropping systems through staff training, motivation and innovation.
- To improve glasshouse and infrastructure design to ensure continuing development and optimisation of cropping systems.
- To improve understanding and optimisation of the aerial environment.
- To improve understanding and optimisation of the rhizosphere.
- To achieve zero production of non-recyclable waste entering air, water, soil or landfill.

Strategies

- To establish best practice and innovation through engagement with developments in a global context.
- Collate information from researchers and suppliers on improved 'precision management' of cropping systems .
- Improve humidity control efficiency.
- Develop novel growing systems.
- Drive research into glasshouse and packhouse robotics.
- Monitor technical developments in lighting and provide information to inform decisions.
- Provide information on closed irrigation systems and their implementation.
- Monitor and research improved control of fertigation.
- Research work with modellers to improve yield prediction.
- Minimise waste at every stage of production and maximise the use of re-usable, recyclable and renewable inputs.

Post-harvest

Targets

- For consumers to identify British products as being of exceptional flavour and eating quality, of high nutritional value, fresh, safe, wholesome and healthy.
- Improve packing, packaging and storage systems to optimise quality delivered to the consumer
- Improve storage processes and extend product shelf-life.
- Continue to maintain strict microbiological integrity of produce throughout the production process.

Strategies

- Collate information and suggest research to improve shelf life and fruit quality.
- Innovation in harvesting, transport, storage, packing, packaging and delivery systems to ensure quality and integrity of produce is optimised and never compromised.
- Research ethylene scavengers and novel shelf life extension systems in packhouse and final packaging.
- Produce research data to support and encourage promotion of health benefits of tomato consumption.
- Provide up to date data on constituents of tomato relating to nutritive quality.
- Inform key stakeholders to improve understanding of the British product. Why is British Best?

The TGA Technical Committee will review their Research and Development Strategy on an annual basis. For further information and all enquiries please contact:

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