

**british** 

TOMATO GROWERS' ASSOCIATION

**RESEARCH AND DEVELOPMENT**

**PRIORITIES**

**FOR**

**BRITISH TOMATO GROWERS**

**2009**

**Produced by the Tomato Growers' Association Technical  
Committee**

## Objectives and Priorities for Research

British Tomato Growers need research to help them to sustain and improve the profitability and competitiveness of their businesses. This entails the development and implementation of best practice from currently available technology and the incorporation of knowledge provided by new research. The TGA wishes to encourage novel or blue-sky research, but principally it needs to see solutions to the common problems shared by all growers, using technology which is understood by and acceptable to consumers.

Tomato growers have faced severe economic pressures in recent years, primarily as a result of downward pressure on prices, caused by oversupply in Europe and the increased competition between UK retailers. There has been a rapid expansion of production in southern and eastern Europe without due regard to market demand. Currency exchange rates favoured imports into the UK for some years but this has changed significantly in the past year, making imports more expensive at a time when the rising price of some food commodities has become a political and social issue.

Production costs have increased dramatically, of energy in particular, but also of labour and fertilizers. The environmental consequences of energy use have become a dominant political consideration leading to the development of carbon accounting systems, with tomatoes often chosen as an example for the comparison of production systems.

There have been substantial structural changes in the industry as a result of these forces and also a major change in the types of tomatoes produced. This has been a response to market demands for new products, especially those with optimum flavour, but also seeks to add value and to make British products distinctive from imports. This approach is achieving some success and there is a strong demand for high quality, competitively priced British fruit.

These factors have all operated against a background of increasing demands for food safety and environmental protection, which British growers are confident they can achieve at the highest level.

Regrettably this period has also coincided with a reduction in government funding for research and a contraction of research and development resources and facilities as a result. Remaining funding has been largely switched from production to environmental issues. It has never been more important to focus on the principle needs and priorities of growers therefore, which this document seeks to address.

Four distinct objectives have been identified and are detailed in this document. Targets have been set and possible strategies to meet these targets are detailed.

In earlier TGA R&D strategy documents, high, medium or low priority rankings were assigned to individual topics. In view of the current constraints on research funding and facilities, it has not been thought worthwhile to include other than high priority areas. Of these however, optimising production efficiency, particularly in relation to the two major costs of labour and energy use and maximising fruit quality, represent the highest priorities.

## **Objective 1**

**To improve profitability by increased production efficiency through better use of resources, particularly energy and labour.**

### **Targets**

- Considerable progress has been made in achieving the target of a 30% reduction in energy over 10 years set in 2003 and efforts to achieve this or more will continue.
- A 20% reduction in labour use per unit of production in the next 10 years.
- The optimisation of all inputs.

### **Strategies**

#### ***General***

- Conduct economic research to secure comparative data on British and overseas production in order to assess competitiveness, especially in energy and labour use and identify problem and opportunity areas.

#### ***Production***

- Seek and capitalise on all opportunities to improve yields per unit input.
- Develop more accurate yield prediction models for all fruit types.
- Optimise the use of carbon dioxide, including the response of alternative tomato types and the interaction of these with plant populations.
- Optimise the root zone with regard to its physical and chemical environment and the application of water, through improved monitoring and control, both for conventional and Organic systems.
- Develop closed or low ventilation greenhouses.
- Monitor technical developments and the economic aspects of year round production employing supplementary illumination.

#### ***Labour use***

- Identify appropriate ergonomic solutions to crop husbandry and harvesting activities and develop best practice in these areas.
- Develop novel growing systems and investigate the potential for glasshouse robotics.

#### ***Energy use***

- Develop improved energy efficiency systems to reduce costs, whilst optimising the cost-benefit equation. These include insulation and environmental control options, the latter with particular regard to optimum humidity and CO<sub>2</sub> control.
- Identify and promote the use of alternative and renewable energy streams, either on site through anaerobic digestion or the burning of non fossil fuels or by links with other industrial processes.
- Capitalise on opportunities provided by cogeneration of electricity from the primary energy source available on site.

## **Notes**

These strategies need to take account of differences in response between tomato types i.e. classic, cherry, cocktail, plum and beef tomatoes and between fruit harvested loose or on the vine. We would hope that experienced physiologists should be able to offer guidance in these areas, using response data for classic types and considering respective dry matter accumulation, without the need for experiments with growing crops, which are unlikely to be affordable.

## **Objective 2**

**To maintain and develop preferred supplier status with customers and consumers by creating a greater differentiation of premium quality British products from competing imports.**

### **Target**

- For consumers to identify British products as being of exceptional flavour and eating quality, of high nutritional value, fresh, safe, wholesome and healthy.

### **Strategies**

- Exploit "natural" technologies for the delivery of a unique product without recourse to technologies such as Genetic Modification, which are currently unacceptable to many consumers.
- Provide research data on the nutritional content of British tomatoes in order to promote the health benefits from their consumption. This would take account of the range of nutrients involved (carotenoids, other plant pigments, flavonoids, vitamins and minerals). Much of the research in this area has focussed on individual nutrients only and more emphasis on the benefits of whole foods in the diet, with a range of complementary ingredients, is desirable. An examination of the effects of cooking fresh tomatoes should be undertaken to provide comparisons with claims for processed tomato products in this area. This would consider the potential increase in bio-availability of lycopene for instance, but the potential decrease in other nutrient levels, such as Vitamin C and flavonoids.
- Identify those pre- and post-harvest factors, which can be modified to improve fruit quality, as perceived by the consumer, and product integrity through the marketing chain. Particular difficulties need to be addressed with regard to the quality of vine-harvested products. These include evenness of ripening, fruit splitting and the control of truss length and form.
- Identify parameters which limit fruit quality and investigate methods by which greater control can be exerted, including the aerial and root zone environment.

## **Objective 3**

**To avoid losses caused by pests and diseases, by using integrated crop management and without recourse to pesticide intervention.**

### **Targets**

- To achieve the optimum economic level of pest and disease control.
- To have available a wide range of natural and biological solutions, including the use of predators, parasites, and fungal and bacterial agents.
- To avoid the use of pesticides.

- To monitor for new pests and diseases which may become established, especially with predicted climate change, and to seek integrated solutions.

## Strategies

- Develop improved control strategies and biological solutions for those pests and diseases which may currently require pesticide intervention and thus compromise the objective of avoiding pesticide use. These include:
  - Spider mites (especially those causing hyper-necrotic symptoms).
  - Whitefly
  - Leaf miners
  - Macrolophus
  - Mealy bug
  - Lepidopterous pests
  - Viral organisms such as pepino mosaic virus (PepMV), potato spindle tuber viroid (PSTVd), Columnea latent viroid (CLVd), tomato chlorotic dwarf viroid (TCDVd) and tomato mosaic virus (ToMV).
  - Botrytis
  - Powdery mildew
  - Verticillium wilt
- Continue to develop strategies for pests and diseases likely to be influenced by the more specific requirements of organic production, such as Macrolophus and mealy bug.
- Develop optimisation of the glasshouse environment to reduce pest and disease pressure. This includes improved humidity control and attention to risks from condensation.
- Improved hygiene measures.
- Investigate the benefits of closed glasshouse systems and glasshouse screening.
- Maintain expertise in the UK to enable monitoring both here and overseas for new pests and diseases, or those occurring elsewhere with a potential to establish here, and act quickly where cases do occur:
  - Pests, such as Bemisia, Tuta absoluta, Nesidiocoris and Psyllids.
  - Fungi, such as Leveillula.
  - Bacteria, such as Clavibacter, Ralstonia and Xanthomonas.
  - Other viral agents.

## Objective 4.

**To maintain a competitive advantage over foreign imports and satisfy consumer concerns over environmental issues, through the use of technologies which allow growers to adopt more environmentally sensitive and sustainable systems.**

## Targets

- Zero production of non-recyclable waste entering air, water, soil or landfill.
- Operation of closed irrigation systems without risk to yield or fruit quality.
- Assist the development of organic production systems and the solution of particular problems in such systems, which currently represent 6-7% of the British tomato production area.

## **Strategies**

- Develop systems for the disposal of leaves and other plant material by anaerobic or aerobic digestion or other alternatives to landfill.
- Develop reliable recirculation systems so that the risks of disease are minimal, with no crop penalties. This is particularly important with regard to pressures to reduce water use.
- Use recyclable substrates and other production materials e.g. organic and biodegradable substrates such as coir.
- Identify and investigate constraints or difficulties with organic systems, such as adequate nutrition for long-season crops, rotational considerations and specific pest and disease issues, including spider mites, mealy bugs, vascular and foliar diseases.