ClimaFruit - Future proofing the North Sea berry fruit industry in times of climate change

Report to Political Reference Group Members*
Feb 2011

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**Background**

Funded: 50% Interreg IVB North Sea Region (NSR) Programme & 50% National/private funds

Total funding: 6,118,045 Euro

Project life: 01/10/2009 - 30/09/2013

Project aim: ClimaFruit will secure, sustain & grow the economic value of the NSR berry fruit industry under changing climatic conditions by developing a world leading Berry Fruit Cluster in the NSR, ensuring investment, opportunities, sustainable use of resources & the production of healthy food.

Partners: Department of Horticulture, Faculty of Science and Technology, Aarhus University, Denmark (AU)

Faculty of Landscape Planning, Horticulture and Agriculture, Swedish University of Agricultural Sciences, Sweden (SLU)

Norwegian Institute for Agricultural and Environmental Research, Norway (Bioforsk)

Department of Plant & Environmental Sciences, Norwegian University of Life Sciences, Norway (UMB)

Scottish Crop Research Institute, Scotland (SCRI)

LWK Niedersachsen, Fruit Research Institute, Germany (OVA)

**Risk**

Climate change scenarios predict that in the NSR average temperature & rainfall will increase. However, the frequency of irregular & extreme weather events will also increase. These changing conditions provide both opportunities & risks to horticultural industries located in the NSR. Long-term climate changes will provide huge opportunities for the NSR to grow its horticultural sector given that food supplies from Southern European countries will no longer be sustainable due to a limited supply of water in those regions (European Environment Agency Report 2/2004). The NSR will need to produce food products that we currently import & food produced in the NSR will become more financially competitive within the EU market. To be positioned for these opportunities we must first overcome some of the current risks in the NSR. Current risks are linked to crops that are specifically grown in northern EU countries due to their requirement for winter chilling.
(sustained period of cold), e.g. cherries & berry fruit. NSR fruit industries are currently based on cultivars planted many years ago & chosen because they coped with harsh winter conditions & required large amounts of winter chilling. As winters in the NSR have become milder these existing cultivars are no longer sustainable or as productive. In some years little or no fruit are produced from these plants. Countries across the NSR are currently faced with similar challenges & associated employment & financial deficits. This project will focus on blackcurrant, raspberries & blackberries with the intention of delivering innovative technologies that will add value to other fruit crops experiencing similar threats specifically related to changes in the NSR’s climate.

Aim

By connecting the horticultural sector with EU, regional & national governments, we will strengthen the future sustainability of the NSR berry fruit industry during risk from climate change & add value to secure the long-term future of NSR fruit industries. A virtual ‘NSR Centre of Expertise in Berry Fruit’ will be formed by bringing together leading experts (plant breeders, physiologist, biochemists, health researchers, and modellers), commercial partners (Multinational, SMEs, industry stakeholders), consultants, industry boards & national & regional policy makers. We will ensure that public good outcomes are implemented to create lasting value throughout the NSR, specifically both in the short term to secure crops under threat & in the long term to position ourselves to capture future opportunities.

This project will secure the NSR as:

1) A better place to live by reducing chemical use & the carbon footprint of horticultural production systems, provide long term economically & ecologically sustainable solutions around optimal use of water, nutrients & chemicals. Increased plantings of berry fruit will have a positive effect on our environment & landscape. Secure the production of locally grown fruit, providing fresh healthy food products & natural ingredients for foods with reduced chemical residues & underpinning the health & wellbeing of society.

2) A better place to work by creating wealth via employment in local, often rural, communities due to increased job opportunities for a seasonal workforce over summer. New business opportunities will be created that contribute to local economies in the processed & food sector by developing new & improved food products for & from the region.

3) A better place to invest in & export from by overcoming existing risks & demonstrating the opportunity to grow the berry fruit industry in the NSR via increased production of both fresh & processed berry products. Developing a cluster of experts within the NSR will ensure the establishment of a world-leading berry fruit hub focused on implementing sustainable & healthy solutions.
**Transnational benefits**

**Impact**

By developing a NSR cluster of expertise we implement a common growth strategy for the NSR industry. Success will build on & extend national research initiatives to build synergies & accelerate value through multidisciplinary transnational team collaboration. Together we will identify solutions faster & with greater efficiency to secure the future of the NSR berry fruit industry in response to specific changes in the NSR climate. A single country cannot successfully deliver on this project as no single country has the necessary expertise or a sufficiently diverse climate.

We will develop a common set of tools & databases, exchange plant material, carry out trials across at different climatic sites, evaluate performance, exchange fruit samples for analysis, exchange data & knowledge as well as develop & share capability within the project via shared PhD students.

This approach will ensure our likelihood of success, increase the competitiveness of the NSR & accelerate our ability to add value & deliver outcomes that will have a lasting impact. Nationally based experts (with complementary skills), will connect with nationally based commercial partners (multinational, SMEs), industry boards & policy stakeholders & makers, ensuring outcomes are implemented equally across the NSR & deliver on national, NSR & EU policies.

Successful activities & outcomes will lead to an increased knowledge & the application of SMART technologies; this will lead to greater profitability by the industries, growth & increased investment into the NSR.

**Partnership**

A network will be formed by bringing together science experts from 5 nations within the NSR. No single country currently has all the expertise needed to address the current risks. No country experiences the diverse climatic conditions across the NSR from which we can learn & prepare ourselves for continuing change.

In the project, experts will network across the region & within their nation to maximize implementation & ensure delivery of innovation to the market (growers, industry bodies, consultants, food SME & multinational companies). To reduce any risk or barriers to adoption we will fully integrate industry partners & consultants directly into the activities. Regional trials will be carried out both at research sites, providing demonstrations sites, & at growers properties, this will ensure rapid adoption of innovation & technologies & an increased likelihood of growth for the nationally based berry fruit industries.
This network will be strengthened by linking project outcomes with decision makers & end-users that will implement & take up outcomes beyond the life of the project. This will include members from our Political Reference Group (including political consultants & policymakers) & government ministers who will represent the outcomes & risks at a national & EU level. National Ministers have endorsed the project as being aligned to current national priorities & policies for environmental sustainability, reduced use of chemicals & the production of healthy food products.

**Long term outcomes**

**Develop a coherent NSR cluster focused on berry fruit**  
By 2014 developed a virtual NSR ‘Centre of Expertise in Berry Fruit’, involving a strong & collaborative cluster of experts, industry & political stakeholders committed to securing berry fruit & horticulture in general in the NSR.

**Provide climate change solutions & opportunities for the NSR soft fruit industry**  
By 2014 overcome regional & climatic risks to the NSR berry fruit industry by delivering superior plant material better suited to the current & future NSR climate.

**Reduce the carbon footprint of the NSR soft fruit sector**  
By 2014 reduce the carbon footprint of the NSR soft fruit industry (via reducing use of water, chemicals & nutrients) & maximize fruit production & quality.

**Climatic impacts on health**  
By 2014 quantify the impact of climate (water & temperature) on health attributes of fruit, enabling the prediction & mitigation of future impacts of climate change on fruit nutritional, health beneficial & quality

**Balancing low input fruit with high impact health**  
By 2014 define the impact of low input production practices (chemical, water &, nutrients) on human health attributes of current & novel fruit cultivars with specific emphasis on compounds driving nutritional & quality parameters, leading to innovation techniques for manipulating these attributes.

**Provide a climate change & value future map for the NSR soft fruit industry**  
By probabilistic modelling, determine the importance of climate, region & sustainable production on productivity & quality. Develop & implement web-based predictive & decision tools for use by industry to ensure smart decision making into the future.

**Future proofing beyond 2014: adaptation strategies for a competitive future**  
Through simulation of climatic extremes, ensure strategies are in place to secure production of berries into the future. Outcomes will deliver value beyond current NSR climates & beyond 2014.
Year 1 (1 Oct 2009 – 30 Sept 2011) Status & Outcomes

Work Package 1 – Management
Project management established the transnational network of researchers. This required establishment of a project coordination group and a project steering group and identifying financial managers for each of the beneficiaries. A critical 2 day start-up meeting, held in Denmark, enabled the representatives of the beneficiaries to meet and to agree on national activities and on transnational initiatives. This meeting involved exchange of knowledge, approaches and activities occurring at national levels. A Beneficiary Agreement was established and signed. In addition a transnational Political Reference Group was established (with 2 members representing each participating nation). Templates for reporting on national and transnational activities and for financial reporting were established. Reporting requirements and procedures were established.

Reporting was successfully completed for the first 6 mo report (March 2010) and the one year report (September 2010). A Year 1 Beneficiary meeting was held in Scotland that focussed on ways to improve our activity and financial reporting and how to strengthen the transnational aspect of the ClimaFruit project.

Work Package 2 – Communication
A project website was established (www.climafruit.com), information on the project is also available on the NSR website (www.northsearegion.eu/ivb/projects/details/?tid=122). A project by-line and the project logo was developed. This period involved launching the project through a significant volume of promotional activities with public, industry, science and political sectors via a variety of formats; meeting presentations (industry board meetings, industry meetings, and science meetings), email and website releases, press releases and written releases.

A summary of communication and project outputs delivered in Year 1 is presented in Table 1 and details are provided in Appendix 1.

Work Package 3 – Sustainable Practises
A new transnational cultivar trial was establishing across the 5 partner countries, this included planning, and distribution of plant material, agreement on sampling, and analysis protocols. In addition considerable national activities were carried out that focussed on improving sustainability practises in growing berry fruit (organic production, spray technologies, UV light technologies, optimisation of water and nutrients). Significant input has been made in pathogen resistance (aphids, vine weevil, viruses etc) with markers and sources of resistance under evaluation for including into breeding programmes. Advances have also been made at the genetic level with the genetic map construction and genome sequencing efforts continuing at a world leading level. Blackcurrant and raspberry breeding programmes continue to deliver new varieties as outputs. A
linked PhD student was appointed at UMB, Norway.

**Work Package 4 – Health and Wellbeing**

Transnational activities included agreement on, collection of and preparation of berry fruit samples from a range of national experiments on sustainability and climate impacts. Fruit samples will be sent to SCRI for analysis. There has also been capability development through the appointment of two postdocs and a PhD student at SCRI, Scotland and a PhD student at SLU, Sweden. Significant advances have been made in the study of the genetics of human health beneficial components in both raspberry and blackcurrant. Health benefits of berry fruit were identified in the areas of cancer, cardiovascular and neurodegenerative diseases. Preliminary research has shown that these fruit may also prove to be useful as dietary methods to retard the development of type II diabetes and the development of obesity by their inhibitory action toward starch and fat digesting enzymes.

**Work Package 5 – Adaptation Strategies**

Two PhD students were appointed at AU, Denmark (joint education between AU and SCRI). A transnational review on the impact of climate change of soft fruit has been initiated. The genetic factors involved in season extension in raspberry / blackberry are being determined. This work package also included research activities on climate change in relation to chilling requirements and dormancy to determine key drivers. Studies were carried out to determine the potential impact of climate change on fruit quality – these preliminary studies showed that minor temperature changes can significantly altered fruit quality from what is currently considered ideal. The impact of pathogen challenge (duration, over wintering etc) during climate change is being modelled with a view to developing a predictive system for the NSR soft fruit industry. The impact of climate change on winter chilling in blackcurrant is being determined with the aim of developing varieties with a reduced requirement and/or plasticity to intermittent frost damage.

**Table 1:** Summary of communication and project outputs delivered in Year 1. Details on individual outputs are provided in Appendix 1.

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<th>Activity</th>
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<td>Transnational Partner meetings</td>
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<tr>
<td>Industry communication (meetings, presentations, open days &amp; articles for end-users)</td>
<td>87</td>
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<tr>
<td>International scientific published papers</td>
<td>23</td>
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<tr>
<td>Press releases (radio / web/ newspapers)</td>
<td>34</td>
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<tr>
<td>Presentations at International Conferences</td>
<td>28</td>
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<tr>
<td>Capability development activities</td>
<td>12</td>
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<tr>
<td>Transnational demonstration projects</td>
<td>8</td>
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<td>Nationally based feasibility studies</td>
<td>25</td>
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Appendix 1: Activities and Outputs

Scientific Communication (written)
Written Publications (refereed)

- Hancock, R.D. 2009. Recent patents on vitamin C: opportunities for crop improvement and single-step biological manufacture. Recent Patents on Food, Nutrition and Agriculture 1, 39-49. (SCRI) (UK)
• Kassim, A., Poette, J., Paterson, A., Zait, D., McCallum, S., Woodhead, M., Smith, K., Hackett, C.A. & Graham, J. 2009. Environmental and seasonal influences on red raspberry anthocyanin antioxidant contents and identification of quantitative traits loci. (SCRI) (UK)

Written Publications (non-refereed)


Scientific Communication (International Conference Presentations)

• Matttila, P.H., Hellstrom, J., McDougall, G.J., Tiirikka.T., Stewart, D. & Karjalainen, R.O. 2009. Anthocyanin content of commercial blackcurrant juices purchased from various European countries. 4th International Conference on Polyphenols and Health, Harrowgate, 7-11 December 2009. (SCRI) (UK)
• Santos, C., Tavares, L.R., Pontes, V., Alves, P.M., McDougall, G.J., Stewart, D. & Ferreira, R.B. 2009. Portuguese crowberry (Corema album), an interesting antioxidant white berry. 4th International Conference on Polyphenols and Health, Harrowgate, 7-11 December 2009. (SCRI) (UK)
• Stewart, D. 2009. The integration of human health and soft fruit breeding. 4th International Conference on Polyphenols and Health, Harrowgate, 8-10 December 2009. (SCRI) (UK)
• Stewart, D. 2010. Soft fruit as cancer chemopreventative agents: mechanisms, efficacy and translation through to enhanced fruit. 28th International Horticultural Congress, Lisbon, Portugal, 22-27 August 2010. (SCRI) (UK)
• Stewart, D., Xiao, H., Hayes, J.D. & McMahon, M. 2009. Mechanisms by which fruit phytochemicals act as cancer chemopreventive agents. 4th International Conference on Polyphenols and Health, Harrogate, 8-10 December 2009. (SCRI) (UK)
• Nestby R, I Martinussen, A Nes, J Rohloff 2010. Effect on plant development and fruit quality of European blueberry (Vaccinium myrtillus), at different climatic growing conditions in Norway. Book of abstracts CAC Alta 6-8 September 2010. (BIOFORSK) (NO)
• Svensson B. Organic production of raspberries and blackberries in high tunnels in Sweden. Poster at 28th International Horticultural Congress IHC, Aug 22nd-27th 2010, Lisbon, Portugal. (SLU) (SE)

Scientific communication to visitors

• M. Williams 2010. Presentation on Department of Horticulture and Research Activities. Delegates from Foreign Economic Cooperation Centre of Ministry of Agriculture, Beijing, China. 8 September 2010. Aarslev, DK. (AU) (DK)

Industry Communication (meetings, presentations, open days & articles for end users)

• 11-12 February 2010. Oral presentation on Økologisk bringbær i polytunnel – effect av gjødsling og klima. Bioforskonferansen, Sarpsborg. (BIOFORSK) (NO)
• 6-10 December 2009. Derek Stewart - Are polyphenols viable targets for soft fruit plant breeding. Invited presentation at the International Conference for Polyphenols and Health, Harrogate, UK, - Are polyphenols viable targets for soft fruit plant breeding. (SCRI)(UK)
• 14 Dec 2009. Derek Stewart - Presentations to the Blackcurrant Foundation (http://www.blackcurrantfoundation.co.uk/ ), (SCRI) (UK)
• 8 February 2010 Rex Brennan attended meeting regarding collaboration in fruit breeding and research. FEM Research Centre, Trento, Italy (SCRI) (UK)
• Brennan, R.M. - Scottish Raspberry Breeding Consortium meeting, Edinburgh, 2009.11.23 (SCRI) (UK)
• Brennan, R.M. - GSK Blackcurrant Breeding PMC Meeting, SCRI, 2009.06.30 (SCRI) (UK)
• Brennan, R.M. - GSK future planning meeting, 2009.09.14 (SCRI) (UK)
• Brennan, R.M. & /D. Stewart - Visit by Allan White, Plant and Food NZ re future collaborations, 2009.09.15 (SCRI) (UK)
• Brennan, R.M. - National Horticultural Forum seminar, 2009.11.26 (SCRI) (UK)
• Stewart, D and McDougall, G.J. Poster SSCR Fruit Forum, 2010.02.17 (Berry Polyphenols: Bioactivities and Health Benefits (SCRI) (UK)
• Brennan, R.M., GSK Growers Meeting - invited presentation 'Soft Fruit Breeding and Research at SCRI', 2010.03.10 (SCRI)(UK)
• Brennan, R.M., Fruit Propagators’ Meeting, 2010.03.9 (SCRI)(UK)
• Brennan, R.M., Invited speaker at Scandinavian fruit breeding conference, Oslo, Norway 'The SCRI Blackcurrant Breeding Programme – Linking Genomics to Crop Improvement', 2010.03.24 (SCRI) (UK)
• Stewart, D & Brennan, R.M., Project planning meeting with Unilever plc, Bedfordshire., 2010.03.19 (SCRI) (UK)
• Graham J, - Knowledge Scotland web pages; http://www.knowledgescotland.org/briefings.php?id=114 (Breeding For Quality Improvements In Berry Fruit), 2010.02.15 (SCRI) (UK)
• Stewart, - Blackcurrant: fruit for the future, The Blackcurrant Conference, Denmark, 2009.06.7-9 (SCRI) (UK)
• Stewart, D. – Discussion with Berry extract producers BerryPharma, 2009.07.16 (SCRI) (UK)
• Stewart, D - Metabolomic approach to identifying bioactive compounds in berries (poster). International Berry Health Benefits Symposium, Monterey, USA 2009.06.21-24 (SCRI) (UK)
• Stewart, D - A mechanistic approach to fruit phytochemicals and cancer chemoprotection (poster). International Berry Health Benefits Symposium, Monterey, USA 2009.06.21-24 (SCRI) (UK)
• Andersen L, Lindhard Pedersen H 2009. Solbær er sunde. Frugt og Grønt, 9, 376-377 (DK)
• Petersen KK, Lindhard H, Bertelsen M 2009. Dansk konsumfrukt skal fremtidssikres. Frugt og Grønt 11/12: 466 (DK)
• Lindhard Pedersen H 2010. Usprøjtede sorter af Ribs. Frugt og Grønt, 3, 110 (DK)
• Lindhard Pedersen H 2010. De gamle solbærsorter er stadig gode. Frugt og Grønt, 4, 156-157 (DK)
• Williams M, Lindhard Pedersen H 2010. Future-proofing berry fruit, ClimaFruit. Poster. Danish and English (DK)
• Lindhard Pedersen H & Williams M met with Head of Danish Strawberry and Raspberry Board, Søren Olesen, on the raspberry research planned in ClimaFruit (AU) (DK)
• Koefoed Petersen K. and Bertelsen M. Open house on 1. UVC light in protected culture of strawberries to prevent fungal diseases and to reduce pesticide residues. 2. Mini strawberry
cultivar trial in different growing media for growers. 4 participants, 16. July 2010. Aarslev, DK. (AU) (DK)

- Brennan. R. Ribes breeding meeting re fresh market, London. 24-25 Feb 2010 (SCRI) (UK)
- Stewart, D. GlaxoSmithKline blackcurrant growers’ technical meeting, Ross on Wye, England 10 March 2010. (SCRI) (UK)
- Brennan R/Stewart hosted Dr. E. Buck from Plant & Food NZ, for collaborative studies on molecular control of dormancy processes in Ribes. 21-27 June 2010 (SCRI) (UK)
- Brennan R. Blackcurrant grower visits, England. 28 June – 1 July 2010. (SCRI) (UK)
- Stewart, D (2010) Meeting with the Scottish Government Cabinet Finance Secretary John Swinney MSP: discussion of food and human health research at SCRI. (SCRI) (UK)
- Brennan, R.M. Visit by RWG Leese representatives, Germany and discussion regarding fruit production. 2010.08.31. (SCRI) (UK)
- Stewart, D (2010) Meet with Ed Galley, Boots PLC, to discuss exploitation of blackcurrant health benefits. 29th April. (SCRI) (UK)
- Graham J (2010) HDC soft fruit panel meeting Kent. (SCRI) (UK)
- Graham J (2010) Fruit Softening LINK meeting SCRI. (SCRI) (UK)
- Graham J (2010) Blueberry Link meeting SCRI. (SCRI) (UK)
- Brennan, R. 2010. The Scottish blackcurrant breeding and research programme; linking genomics and crop improvement. Scandinavian Fruit Breeding Conference, Drammen 24th March (SCRI) (UK)
- Døving A, 2010. Farmers day 22 June 2010; Organic raspberries at Innvik, Norway. (BIOFORSK) (NO)
• Pluta, S. 2010. Recent status of blackcurrant production and perspectives for future development in Poland. Scandinavian Fruit Breeding Conference, Drammen 24th March. (BIOFORSK) (NO)
• Srbac, S. 2010. Cordon training system for black and red currants. Scandinavian Fruit Breeding Conference, Drammen 24th March. (BIOFORSK) (NO)
• Zurawicz, E. 2010. Dessert type cultivars of blackcurrant – new breeding aim at the Research Institute of Pomology and Floriculture, Skieniewice, Poland. Scandinavian Fruit Breeding Conference, Drammen 24th March. (BIOFORSK) (NO)
• Svensson, B. Field day, Ranna Experimental station, Skövde, Sweden 17 August 2010. (SLU) (SE)
• Svensson, B. ClimaFruit project information presented to Swedish stakeholders, journalists, growers, advisors and researchers, at the Annual Horticultural Conference. Alnarp, Sweden 4 March 2010. (SLU) (SE)
• Rumpunen, K. Polyphenols and vitamin C in organic black currant grown in the south and north of Sweden. Scandinavian Fruit Breeding Conference, Drammen 24th March. (SLU) (SE)

Public Communication (Web sites & Press releases & Interviews)

• Established a communication plan (AU) (DK)
• Established the project logo and byline (SCRI & DK) (UK)
• Solbær, brombær og hindbær skal klimasikres: http://www.agrsci.dk/ny_navigation/nyheder/solbaer_brombaer_og_hindbaer_skal_klimasikres (AU) (DK)
• Blackcurrants, blackberries and raspberries to be climate-proofed: http://www.agrsci.org/ny_navigation/nyheder/blackcurrants_blackberries_and_raspberries_to_be_climate_proofed (AU) (DK).
• Issued a press release to the UK press regarding the ClimaFruit project (SCRI) (UK)
• Stewart, D - Press release “Scotland joins North Sea region coalition to boost berry industry”, 2010.02.17 (SCRI) (UK)
• Stewart, D. - The Scotsman - SCRI takes major role in ClimaFruit group aiming to boost berry industry, 2010.02.17 (SCRI) (UK)
• Stewart, D. – Press and Journal “£5m study boost for soft fruit sector”. 2010.02.17 (SCRI) (UK)
• Stewart, D. – The Farmer, “Coalition boost to the berry industry”, 2010.03.01 (SCRI) (UK)
• Stewart, D. – BBC website “Climate change threat to berries”, (SCRI) (UK) http://news.bbc.co.uk/1/hi/scotland/tayside_and_central/8519793.stm
• Stewart, D. - Horticulture Week, Scientists join European soft fruit project. 2010.02.26 (SCRI) (UK)
• Stewart, D. - Grocer, Scientists join European soft fruit project. 2010.02.26 (SCRI) (UK)
• Stewart, D. - Fresh Produce Journal, SCRI teams up with northern Europe in berry boost. 2010.02.19 (SCRI) (UK)
Stewart, D. - Dundee Evening Telegraph, Invergowrie-based scientists have joined a multinational effort to help protect Tayside and Fife's soft fruit crops from the effects of climate change. 2010.02.17 (SCRI) (UK)

Stewart, D. - BBC Radio Scotland - Good Morning Scotland, Soft fruit is worth millions each year to Scottish growers. Action to be taken against climate change and the effects it could have on the industry. Scottish Crop Research Institute to get involved in research to protect the industry. 2010.02.17 (SCRI) (UK)

Stewart, D. - Tay FM News, Scientists are to protect the soft fruit industry, in an initiative lead by the Scottish Crop Research Institute. 2010.02.17 (SCRI) (UK)

Stewart, D. - BBC1 (TV) Scotland - Reporting Scotland, Scientists in Scotland join international consortium working to safeguard the future of the soft fruit industry. 2010.02.17 (SCRI) (UK)

Stewart, D. - Horticulture Week, Scientists at the Scottish Crop Research Institute (SCRI) have joined Denmark, Sweden, Norway and Germany with the goal of securing the long-term future of the soft fruit industry. 2010.02.17 (SCRI) (UK)

Stewart, D. - BBC1 (TV) Scotland - Reporting Scotland, Scientists in Scotland have joined an international consortium working to safeguard the future of the valuable soft fruit industry. 2010.02.17 (SCRI) (UK)

Stewart, D. - STV News, The climate change threat to Scotland's multi-million pound soft fruit industry is being tackled by an international group of scientists. 2010.02.17 (SCRI) (UK)

Stewart, D. - Wave 102 FM Radio News, Dundee is to take a leading role in securing the long term future of the soft fruit industry. 2010.02.17 (SCRI) (UK)

Poster at 'Forskningsdøgn'. Annual Danish Science Day. Open Day for Public. Aarlsev DK. 464 attendees. (AU) (DK)

Efforts to boost blueberry production launched. Press and Journal, UK. 16 July 2010. (AU) (DK)

Take a bigger bite of fruitful blueberry market, Scots growers urged. Scotsman newspaper, UK. 17 July 2010. (AU) (DK)


Nestby R, 2010. Hail showers have destroyed the gold of the forest. Adressa. no, 19.07. 2010. (BIOFORSK) (NO)

Nestby R, 2010. The blueberry project on national TV. The Langvatn/Snåsa forest field, 11 august 2010. (BIOFORSK) (NO)


Capability development activities

A PhD student (Natasa Cerekovic) was appointed in August 2010 at AU, Denmark, with the following as the project: “Plasticity of black currants in a changing climate: focus on water efficiency” has been filled. The primary supervisor is Dr. Hanne Lindhard Pedersen, AU and co-supervising by Dr. Rex M. Brennan, SCRI and Dr. Hanne Lakkenborg Christensen, AU.

A PhD student (Tek Prasad Gotame) was appointed in August 2010 at AU, Denmark, with the following as the project: “Impact of climate on productivity and quality of raspberry” has
been filled. The primary supervisor is Dr. Hanne Lindhard Pedersen, AU and co-supervising
by Dr. Julie Graham, SCRI and Dr. Karen Koefoed Petersen, AU.

  Students from Wageningen University, Holland, Aarslev DK, Talk 30 students. 19 male 11
  female. (AU)
  Holland, Aarslev DK, Talk 30 students. 19 male 11 female. (AU)
  Antioxidant Abilities. Copenhagen University. DK
  Students, Copenhagen University, Aarslev DK. 20 persons, 15 female and 5 male. (AU)
- Brennan, R.M. (2010). Collaborative visit by E. Buck, Plant & Food NZ (training) 2010.06.21
  2010.06.25. (SCRI)
- A ClimaFruit funded **PhD student** (Katarzyna Goszcz) was appointed at SCRI, Scotland, with
  the following as the project: The impact of soft fruit on degenerative diseases: metabolic
  fate and mechanisms of action” has been filled. The primary supervisor id Dr Derek Stewart
  and the co-supervising academic is Professor Ian Megson, Department of Diabetes &
  Cardiovascular Science, University of the Highland and Islands, Inverness
  ([http://www.uhi.ac.uk/home/faculties/health/diabetes](http://www.uhi.ac.uk/home/faculties/health/diabetes)).
- A **post doc** (Sean Conner) was appointed at SCRI, Scotland, with the following responsibility:
  quality and phytochemical analysis of all fruit derived from Climafruit sponsored
  experiments. Dr Connor was appointed on 1st August and will be employed for the duration
  of the project (until 30th September 2013). Dr Derek Stewart is the direct supervisor.
- A **post doc** (Alex Foito) has been appointed at SCRI, Scotland, with the following
  responsibility: elucidation of the impact of climate change and environment on fruit crop
  development and metabolism. Dr Foito was appointed on 1st June and will be employed for
  the duration of the project (until 30th September 2013). Dr Derek Stewart is the direct
  supervisor.
- A **PhD student** (Michael Rajeev Vagiri) was appointed in August 2010 at SLU Balsgård,
  Sweden, in the cofunded project “Ontogenetic and genetic effects of health promoting
  compounds in black currants” which will continue until 2013. The primary supervisor is Dr.
  Eva Johansson, SLU Alnarp and co-supervised by Dr. Kimmo Rumpunen, SLU Balsgård and
  Dr. Staffan Andersson, SLU Alnarp.
- A **PhD student** (Sebastian Piotr Mazur) was appointed in September 2009 at UMB, Norway,
  in the cofunded Norwegian project “1210148 Improved cultivars of strawberry and
  raspberry for the processing industry”. The project is a joint project between Bioforsk, UMB
  and Nofima (The Norwegian Institute of Food, Fisheries and Agriculture Research). The
  primary supervisor is Dr Anne-Berit Wold, UMB and the student is cosupervised by Kjersti
  Aaby from Nofima (The Norwegian Institute of Food, Fisheries and Agriculture Research)
  and Arnfitt Nes (BioForsk).
### Appendix 2: ClimaFruit Political Reference Group Members

#### Denmark

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<th>Torben Lippet</th>
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<td>Erhvervspolitisk konsulent / Policy Advisor</td>
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<td>Deputy Director, Farming and Food Science Evidence and</td>
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