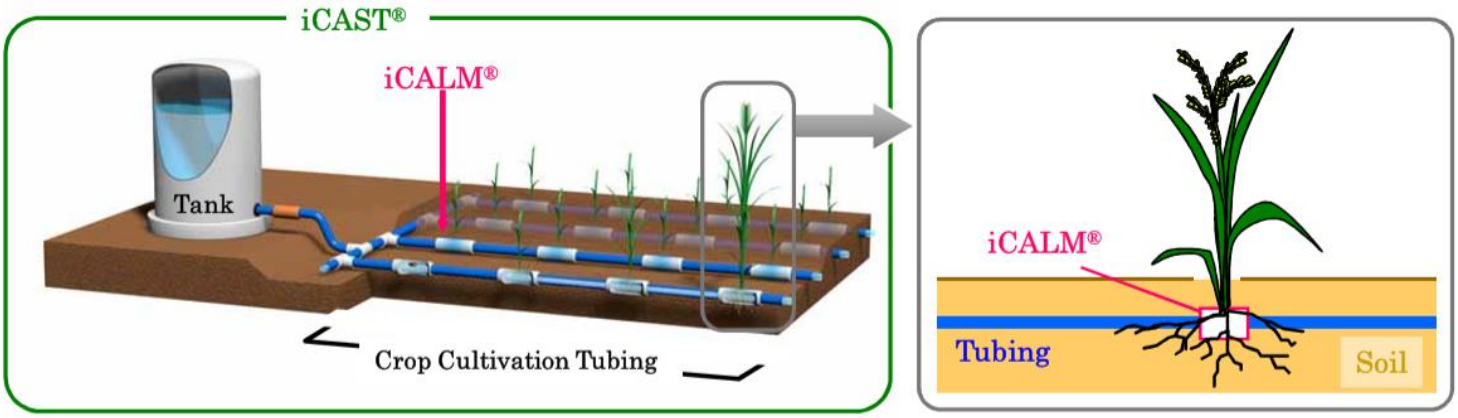
Mitsui Chemicals' Revolutionary iCAST® (Integrated Cultivation-Accelerating System)

Hamilton, Victoria, October 19, 2018

Mitsui Chemicals, one of the largest chemical companies in Japan, has over recent years, been developing its iCAST® crop cultivation system which, in field trials, has proved to sufficiently increase output and quality, whilst reducing water consumption, fertiliser and pesticide use and labour for crops including tomato, broccoli, capsicum, lettuce, wheat and canola. These trials have been carried out in conjunction with the Department of Economic Development, Jobs, Tourism and Resources (DEDJTR) at the Field Research station at Hamilton, Victoria.

Mitsui Chemicals is now planning to make the iCAST® technology commercially available in Australia.



A series of field and lab experiments were conducted at Department of Economic Development, Jobs, Transport and Resources (DEDJTR), Hamilton, Victoria to evaluate the iCAST® system, from 2015 to 2018. Several crops such as wheat, canola, broccoli, trio lettuce, processing tomato and red capsicum were examined in terms of establishment, growth, production, product quality and water/nutrient use.

Key findings of the trials:

- iCAST® increased the tiller density of wheat by 10% and reduced the plant height of canola by 17 cm. Wheat grain yields were over 20% greater under the iCAST® system than under rain-fed conditions in 2015/16.
- The total above-ground and head biomass and the harvest index of broccoli were 14 – 32% higher under iCAST® than drip irrigation. The rating of head quality, shape and colour of broccoli was up to 64% higher under iCAST® than drip irrigation.
- iCAST® tomato had 8% higher total dry matter of tomato fruits and 14% higher total dry matter of whole plant (fruit + leaf/stem) than drip irrigation.
- iCAST® tomato fruits were significantly redder, firmer and had approximately 62-75% higher lycopene concentration and 30-34% higher total soluble solids concentration (SSC) than drip irrigated fruits. SSC and lycopene concentration are critical quality attributes for processing tomatoes.
- iCAST® increased the Vitamin C concentration of trio lettuce by 57% and reduced the severity of rots and disorders by 27% in comparison with the drip irrigation treatment.
- The yield and harvest index of red capsicum under iCAST® were significantly higher than under drip irrigation both in fresh and dry matter of fruits on a per plant basis.
- Red capsicum fruits were significantly heavier, slightly firmer, and sweeter (by ~2 °Brix) and contained significantly more vitamin B9 – folate (330%) and vitamin C (33%) under iCAST® than drip irrigation.
- iCAST® system reduced the water use of wheat, canola and broccoli by 50-60% compared with drip irrigation when plastic sheets were used to cover beds under rain-fed condition.

A Public Briefing, open to Growers and Journalists, will be held on Nov 27th 2018; 10 am - 1pm at the DEDJTR Hamilton Research Centre

"The iCAST® trials at Hamilton show excellent crop germination from seed with the potential to grow crops in marginal, unproductive land, with minimum water and fertiliser input; bio-fortify plants with health compounds; as well as deliver precise, targeted application of systemic pesticides to the root zone of plants."

- Zhongnan Nie, Senior Research Scientist - Agriculture Research at the Department of Economic Development, Jobs, Transport and Resources, Hamilton, Victoria

"Apart from the field trials with DEDJTR in Hamilton (that have been ongoing since 2015), from April 2018 onwards, Mitsui Chemicals commenced field trials with a large grower in Victoria. With plans to extend this to other growers across Australia and with commercial production of iCAST® in Victoria from late 2019 onward, Mitsui Chemicals is actively looking for sales and promotion partners in Australia to help the agricultural sector realise the benefits of this novel crop cultivation system."

- Hirozumi Matsuno, Manager, Next Generation Business Development Division, Mitsui Chemicals, Inc.

"Australia's water scarcity crisis is once again throwing the spotlight on the formidable challenges facing the Australian agriculture sector. Apart from climate change impacts, farmers are also battling higher inputs costs, labour shortages and lower returns. An example of futuristic farming technology that can help the country address these challenges is Mitsui Chemicals' iCAST®. Significantly, commercial production of iCAST® is to commence in Victoria, helping build Australian expertise and capability in innovative agri-technology systems, whilst supporting manufacturing employment in rural Victoria."

- Mark Dougan, Managing Director, Frost & Sullivan, Australia & New Zealand