Prizes and Publications

Prizes

NARO RESEARCH PRIZE 2019

- **Higashide, Ahn and Saito (2019) Growth and yield prediction tool for horticultural crops.**

NARO Research Prize 2019 ▶

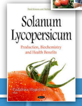
Scientific Journals

- Oota *et al.* (2019) Development of Small Automatic Guided Vehicle by Contact Detection to Hydroponics Cultivation System. JARQ **53**(1):31-40
- Oota *et al.* (2019) Development of yield and harvesting time monitoring system for tomato greenhouse production. EAEF **12**(1):40-47
- Mochizuki *et al.* (2019) Application of a Growth Model to Validate the Effects of an Ultrafine-bubble Nutrient Solution on Dry Matter Production and Elongation of Tomato Seedlings. Hort. J. **88**(3): 380–386
- Kawasaki *et al.* (2018) Differences in Water and Assimilate Fluxes in Tomato Fruits among Cultivars, and Relationships with Fruit Yield and Soluble Solids Content. Hort. J. **87**(2): 229–235
- Oyama *et al.* (2017) Bayesian QTL mapping using genome-wide SSR markers and segregating population derived from a cross of two commercial F_1 hybrids of tomato. Theor. Appl. Genet. **130**:1601-1616
- Higashide *et al.* (2017) Differential Influences of Leaf Tip Trimming on Light Interception and Dry Matter Production in Tomato Dutch Cultivar Gourmet and Japanese Cultivar Momotaro York. Hort Sci. **52**(5):686-691

Books

- Nakano *et al.* (2018) Production of environmental control system for ICT agriculture. Seibundo-Shinkousya. (Japanese)
- Higashide (2016) Solanum Lycopersicum: Production, Biochemistry and Health Benefits. Nova Science Publishers.

ICT農業の環境制御システム製作



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Mail form ▶

NARO
Tsukuba Plant Factory

Advanced Technologies for Smart Greenhouse Production Systems in Japan

SUSTAINABLE DEVELOPMENT GOALS
IoT
Smart Agriculture
Society 5.0
内閣府作成

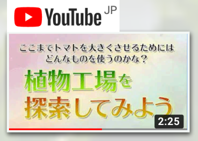
Realization of smart agriculture and integration of advanced technologies to Next-generation horticulture in Japan

1 Welcome to NARO Tsukuba plant factory !

▶We aim to contribute to the realization of Japan's world-leading agriculture and Society 5.0 by advancing Japanese horticulture.

▶ Our goal is to dramatically increase the yield at the greenhouse and the plant factory in the context of a declining farming population and unprecedented climate change. We are conducting empirical research with the goal of systematizing and disseminating technologies that reduce production costs.

▶You can see the introduction movie of Tsukuba plant factory !



ここまでトマトを大きくさせるためには
どんなものを使うのかな？
植物工場を
探索してみよう
2:25

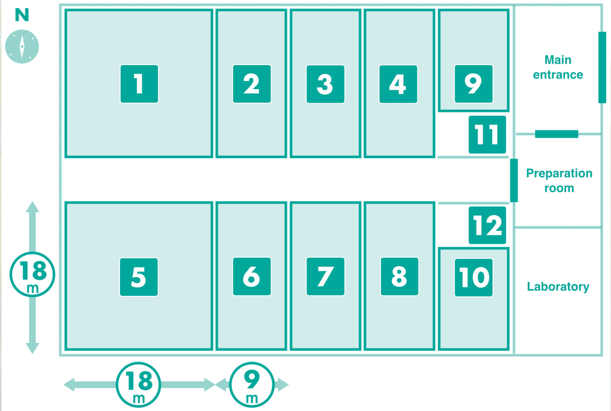
2 Our facilities and equipments

- 63 m wide × 40.5 m long, 5.1 m eave hight
- 2,551 m² in area
- Covering materials
  Side walls: glass; roof: ETFE film (diffused)
- UECS (Ubiquitous Environment Control System)

1 ~ 8
Growing rooms
162 m² : 6 rooms
324 m² : 2 rooms

9 ~ 10
Seedling nursery rooms
108 m² : 2 rooms

11 ~ 12
Artificial light nursing cabinet

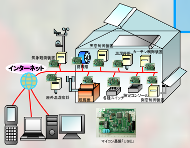


SUSTAINABLE DEVELOPMENT GOALS

IoT

Smart Agriculture

Society 5.0
内閣府作成



- Since 2016, we have demonstrated large-scale greenhouses using advanced environmental control by ICT and local resource energy.

3 Overview of our project

Realization of high yield scheme
➡ Advanced technologies ＋ Element integration

Realization of high yield by predicting plant growth

- Develop new varieties 'Ringyoku'
- Achieved annual yield of 55 kg/m2

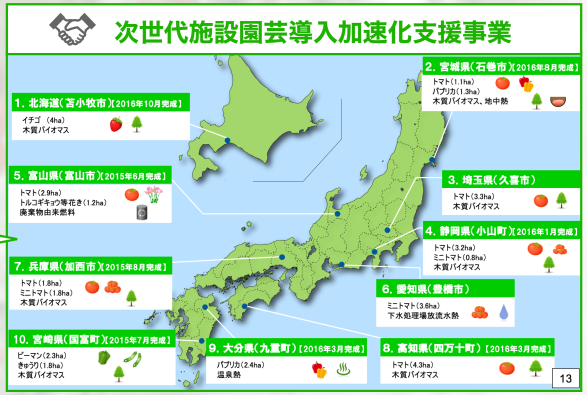
Development of advanced environmental control system

- UECS
  (Ubiquitous Environment Control System)

ICT農業の
環境制御
システム製作

Automation and advanced information utilization

- Automation of management system and work management



次世代施設園芸導入加速化支援事業

1. 北海道（苫小牧市）【2016年10月完成】
イチゴ　（4ha）
木質バイオマス

2. 宮城県（石巻市）【2016年8月完成】
トマト（1.1ha）
パプリカ（1.3ha）
木質バイオマス、地中熱

3. 埼玉県（久喜市）
トマト（3.3ha）
木質バイオマス

4. 静岡県（小山町）【2016年1月完成】
トマト（3.2ha）
ミニトマト（0.8ha）
木質バイオマス

5. 富山県（富山市）【2015年6月完成】
トマト（2.9ha）
トルコギキョウ等花き（1.2ha）
廃棄物由来燃料

6. 愛知県（豊橋市）
ミニトマト（3.6ha）
下水処理場放流水熱

7. 兵庫県（加西市）【2015年8月完成】
トマト（1.8ha）
ミニトマト（1.8ha）
木質バイオマス

8. 高知県（四万十町）【2016年3月完成】
トマト（4.3ha）
木質バイオマス

9. 大分県（九重町）【2016年3月完成】
パプリカ（2.4ha）
温泉熱

10. 宮崎県（国富町）【2015年7月完成】
ピーマン（2.3ha）
きゅうり（1.8ha）
木質バイオマス

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