

# Therapeutic Horticulture

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# Objectives

- Provide an **introduction** to therapeutic horticulture
- Briefly review the **historical context**
- Discuss the **current available literature**
- Explore **future options** for treatment and research
- **Encourage participation** in therapeutic horticulture as an adjunct to a multidisciplinary plan for **health and wellness**



# Financial Disclosures

- Homegrown Healthcare, LLC.
  - Therapeutic garden and aquaculture design and education



# What is Therapeutic Horticulture?

- Therapeutic modality that uses plants and plant-based activities to assist people with disabilities or traumatic injuries
- Combines fine and gross motor movements with phototherapy (sunlight) and a sense of mental accomplishment/purpose that improves overall well-being
- Can also serve as a form of vocational rehab should the patient decide to pursue employment within the botanical field



- Many synonyms with slightly varied implications
  - Therapeutic horticulture
  - Horticultural therapy
  - Garden therapy
  - Nature-assisted therapy
  - Green care
  
- Poses a challenge for researching the topic



# Brief history

- Plants have been intertwined with medicine for centuries
  - Ancient Greeks ~8000 BC
  - Egyptians ~3000 BC
  - Chinese herbal medicine ~2500 BC
- Japanese Zen Garden ~700 AD
- Monastic Gardens ~400-1500 AD



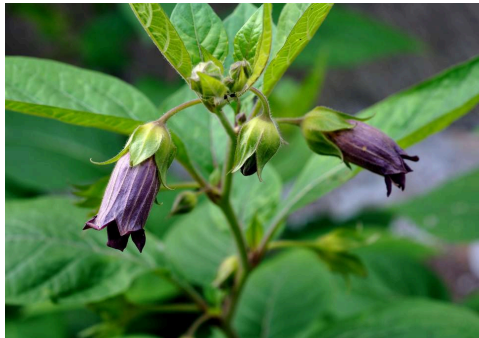


# Plant-derived medicines

- Digoxin



- Epidiolex



- Atropine



- Quinine

- Morphine



- Vincristine



# Types of Therapeutic Gardens

- **Community garden**
  - Provides low sugar, high fiber, nutrient dense food
  - Treatment for:
    - Metabolic syndrome
    - Obesity and its MSK sequelae
    - Malnutrition
- **Memorial Garden**
  - Improve psychological well-being
  - Aid in grieving process
- **Sensory Garden**
  - Geared toward pediatrics or cognitively impaired
  - Scents, textures, colors
  - Plants and related (wind chimes, rocks, running water)

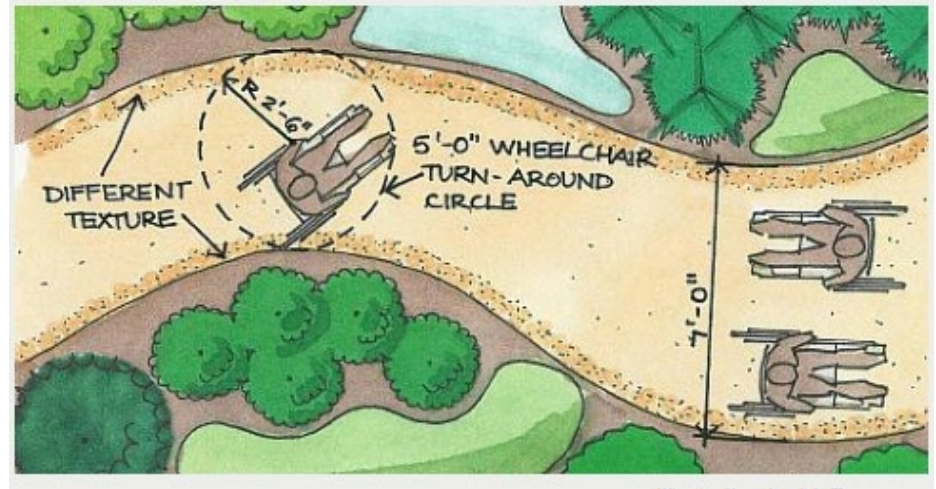




# Design elements to consider

## ■ Purpose

- Physical parameters
  - Height of the plant beds
  - Surface type
  - Width of the walkways
  - Temperature regulation
- Functional impairments
- Plant selection
- Age of user



## ■ Cost

- Expenses
- Savings



# Therapeutic uses

- Dementia and the cognitively impaired
- Depression/other mental health ailments
- General wellness
- Veteran care
  
- Non-combat trauma survivors



# What Is the Impact of Using Outdoor Spaces Such as Gardens on the Physical and Mental Well-Being of Those With Dementia? A Systematic Review of Quantitative and Qualitative Evidence

Rebecca Whear MSc<sup>a,\*</sup>, Jo Thompson Coon PhD<sup>a</sup>, Alison Bethel BSc<sup>a</sup>,  
Rebecca Abbott PhD<sup>a</sup>, Ken Stein MB ChB, MSc, MD<sup>a</sup>, Ruth Garside PhD<sup>b</sup>

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- Systematic Review
- Used agitation, pacing, elopement attempts, violence
- Emotional outcomes
  - Pleasure, anger, anxiety, sadness
- Physical outcomes
  - Sleep time and quality
  - Total walking
- Medication Reduction
- Improved patient, family, and staff satisfaction



## REVIEW

**Benefits of sensory garden and horticultural activities in dementia care: a modified scoping review**

Marianne T Gonzalez and Marit Kirkevold

- 16 studies
- Improvement in wellbeing, agitation, disruptive behaviors, sleep patterns



# EVALUATION OF A HORTICULTURAL ACTIVITY PROGRAMME FOR PERSONS WITH PSYCHIATRIC ILLNESS

*Michael C.Y. Kam<sup>1</sup> and Andrew M.H. Siu<sup>2</sup>*

- Horticultural therapy is effective in **decreasing** the levels of **anxiety, depression, and stress** among participants







Contents lists available at ScienceDirect

## Preventive Medicine Reports

journal homepage: <http://ees.elsevier.com/pmedr>



Review article

### Gardening is beneficial for health: A meta-analysis

Masashi Soga <sup>a,\*</sup>, Kevin J. Gaston <sup>b</sup>, Yuichi Yamaura <sup>c</sup>

<sup>a</sup> Graduate School of Agricultural and Life Sciences, The University of Tokyo, 1-1-1 Yayoi, Bunkyo, Tokyo 113-8657, Japan

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<sup>c</sup> Forestry and Forest Product Research Institute, Matsunosato 1, Tsukuba, Ibaraki 305-8687, Japan

- Reductions in depression and anxiety symptoms, stress, mood disturbance, and BMI
- Increases in quality of life, sense of community, physical activity levels, and cognitive function.



Review

## Whatever happened to the soldiers? Nature-assisted therapies for veterans diagnosed with post-traumatic stress disorder: A literature review



Dorthe Varning Poulsen\*, Ulrika K. Stigsdotter, Anne Dahl Refshage

*Department of Geosciences and Natural Resource Management, University of Copenhagen, Rolighedsvej 23, DK- 1958 Frederiksberg C, Denmark*

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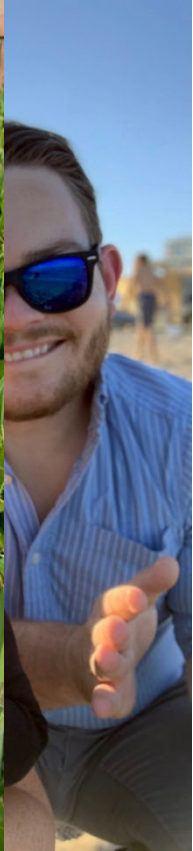
# Horticultural Therapy: A Pilot Study on Modulating Cortisol Levels and Indices of Substance Craving, Posttraumatic Stress Disorder, Depression, and Quality of Life in Veterans

Mark B. Detweiler, MD, MS; Jennifer A. Self, PhD; Sandra Lane, MA; Luise Spencer; Brian Lutgens, MSW;  
Dong-Yun Kim, PhD; Mary H. Halling, MSN; Tammie F. Rudder, RN, MSN; Lauren Lehmann, MD

## Healing and Empowering Veterans in a Botanic Garden

Barbara Kreski







Therapeutic Horticulture as an Effective Treatment for  
Stress Related Symptoms in Non-combat Trauma  
Survivors: A systematic review



# Methods

- Articles were identified from four major medical indices published from 1973-2017 using search terms for therapeutic horticulture and “snowballing”
- Goal was to be as inclusive as possible
- Inclusion criteria:
  - Inciting **traumatic event**
  - Must mention **stress sx** which can include depression
  - Some form of **therapeutic horticulture intervention**
- Exclusion criteria:
  - Non-English
  - Veterans (previously well substantiated)
  - Dementia/mental health disorders as primary Dx





# What constitutes trauma?

"An overwhelming experience that often induces terror and helplessness"

- Esther Perel

- MVA, chronic illness or acute medical diagnosis, torture/abuse, incarceration, homelessness, etc.



# What constitutes stress symptoms?

- Did not require a formal diagnosis of PTSD
- Based on DSMV criteria for PTSD
  - Persistent and exaggerated **negative beliefs or expectations** about oneself, others, or the world
  - Persistent negative emotional state (e.g., **fear**, horror, **anger**, **guilt**, or shame)
  - **Diminished interest** or participation
  - Feelings of **detachment**
  - **Inability to experience happiness**, satisfaction, or loving feelings
  - **Irritable behavior** and angry outbursts
  - Reckless or **self-destructive behavior**
  - Problems with concentration
  - **Sleep disturbance**



# Methods cont.

- Two researchers then separately reviewed the remaining 67 studies
- Final inclusion of a study was determined together
- 9 articles met the inclusion criteria of therapeutic horticulture used as a treatment for trauma-related stress symptoms in a non-combat patient population



Potentially relevant articles identified and screened from PubMed, Embase, Scopus, and Cochrane (n=304)

Articles excluded based on title and abstract (n=237)

Articles retrieved for more detailed evaluation (n=67)

Articles excluded: (n=58)

- No stress symptoms (n=22)
- No trauma (n=13)
- No therapeutic intervention (n=5)
- Cognitive disorder as 1° (n=7)
- Combat Veterans (n=8)
- Reviews (n=2)
- Non-English studies (n=1)

Articles included in the systematic review (n=9)



# Results

- Due to the varied nature of the intervention, the included studies were heterogeneous for participant characteristics, intervention type and duration, outcomes measured, and methodological quality.
- Of the four studies that included control groups, three showed that those subjects receiving some form of therapeutic horticulture had statistically significant improvements in mood, depression, and anxiety with the fourth study showing statistical improvement in a subset of the population studied.





# Results

- Remaining five studies all showed improvement in various aspects of well being including self-efficacy, quality of life, general health perception, and fatigue.




# Horticultural Therapy for Patients With Chronic Musculoskeletal Pain: Results of a Pilot Study

Martin L. Verra, MPTSc; Felix Angst, MD, MPH; Trudi Beck, MSc; Susanne Lehmann, RN; Roberto Brioschi, MSc;  
Renata Schneiter, MSc; André Aeschlimann, MD

- Rehab inpatients with chronic, nonspecific back pain, or fibromyalgia
- 79 total: 39 HT, 42 control
- 4 week interdisciplinary pain management program with adjuvant horticultural therapy
- Statistically significant difference between intervention and control groups in SF-36 (role physical, mental health) HADS anxiety, CSQ pain behaviors





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# Effects of Horticultural Therapy on Mood and Heart Rate in Patients Participating in an Inpatient Cardiopulmonary Rehabilitation Program

Matthew Wichrowski, HTR; Jonathan Whiteson, MD; François Haas, PhD; Ana Mola, RN, ANP; Mariano J. Rey, MD

- 107 total participants: 59 HT, 48 control
- Single intervention: greenhouse tour plus planting activity
- Statistically significant lower Total Mood Disturbance (improved) and lower HR in the intervention group



# An Eight-Week Horticultural Therapy Program for Stroke Outpatients: A Case Study

S.-A. Park<sup>1</sup>, C.A. Shoemaker<sup>2,a</sup>, S. Harms<sup>3</sup>, D. O'Neill<sup>3</sup> and D.-M. Oh<sup>2</sup>

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<sup>2</sup> Department of Horticulture, Forestry, & Recreation Resources, Kansas State University, Manhattan, KS 66503, USA

<sup>3</sup> Mercy Regional Hospital, Manhattan, KS 66502, USA

- 1 hr horticultural therapy twice per week for a total of 16 sessions
- Improvement in grip strength, pinch force, fine motor dexterity, and eye-hand coordination
- Stroke Impact Scale showed increased health-related quality of life especially for memory, emotion, ADLs, and hand function



# Effects of Horticultural Therapy of Self-Esteem and Depression of Battered Women at a Shelter in Korea

S. Lee  
Department of Nursing Science  
College of Medicine  
Dankook University  
Korea

M.S. Kim and J.K. Suh  
Department of Horticultural Therapy  
Graduate School  
Dankook University  
Korea

- 12 week horticultural therapy program
- Statistically significant improvement in post-intervention self-esteem scores compared to control
- Statistically significant improvement in depression scores compared to control



# SPIRITUAL CARE OF CANCER PATIENTS BY INTEGRATED MEDICINE IN URBAN GREEN SPACE: A PILOT STUDY

Maiko Nakau, MAgri,<sup>1</sup> Jiro Imanishi, PhD, MD,<sup>2</sup> Junichi Imanishi, DAgri,<sup>1,3,#</sup> Satoko Watanabe, PhD,<sup>2</sup> Ayumi Imanishi, DAgri,<sup>3</sup> Takeshi Baba, DGlobalEnv,<sup>3</sup> Kei Hirai, PhD,<sup>4</sup> Toshinori Ito, PhD, MD,<sup>4</sup> Wataru Chiba, PhD, MD,<sup>5</sup> and Yukihiro Morimoto, DAgri<sup>1,3</sup>

- 22 breast and lung cancer patients
- Combination of forest therapy, horticultural therapy, yoga, and meditation once a week for 12 weeks
- Improvements in functional and spiritual well-being
- Improved physical functioning, general health perception, vitality, and mental health
- Reduction in total fatigue, tension, and anxiety



# Urban Farming: A Non-Traditional Intervention for HIV-Related Distress

Enbal Shacham · Michael F. Donovan ·  
Shannon Connolly · Andrea Mayrose ·  
Mary Scheuermann · E. Turner Overton

- Urban farm work 2 days per week x 8 weeks
- Non-statistical improvement in distress symptoms, improved overall general health, and reduced frequency of illicit drug use





# Design and Implementation of Horticultural Therapy with Children Affected by Homelessness and Domestic Violence



*Johanna Keeley, M.Ed and Leigh Anne Starling, HTR*

- 20 participants
- Weekly for varied duration to transient nature of the shelter inhabitants
- Improvement in community interaction, emotional expression, sense of physical satisfaction, decrease in isolation, improved self-esteem and confidence



# The Importance of Community Gardening for Homeless Women: A Pilot Study

Cathy A. Pierce and Linda M. Seals

- 6 residents of a South Florida family shelter
- 1 hour weekly class of garden education for 12 weeks and supervised garden work + unstructured amount of time in the garden
- positive perception of time spent in the garden, improved self-efficacy



# Outcomes

- Decrease BP and restore functional mobility
  - Modality: **Gentle exercise**
- Mitigate anxiety, increased gratitude, reduce substance abuse
  - Modality: **Intention and purpose**
- Lower blood sugar, improve lipid profile, prevent and correct deficiencies
  - Modality: **Plant-based nutrition**

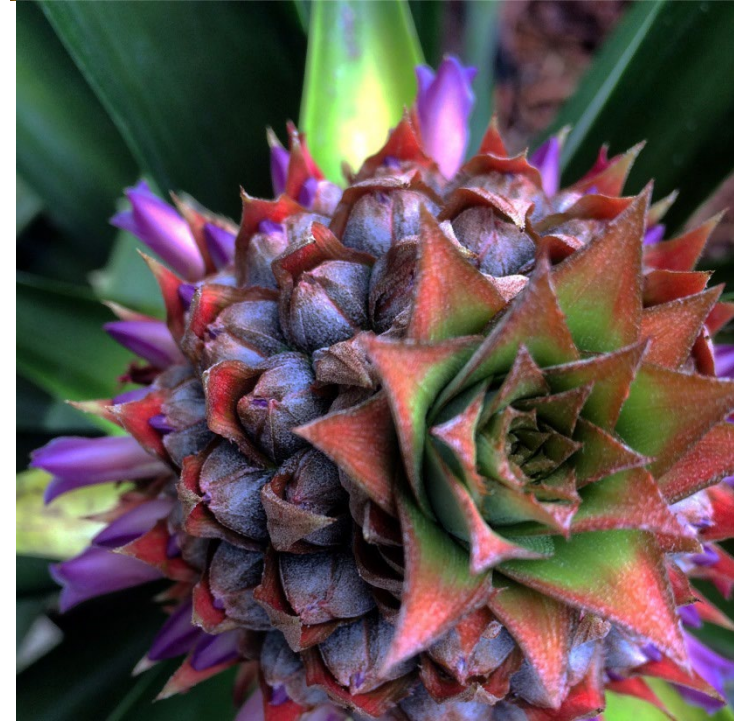


# Future considerations

- Need for **larger and more robust studies**... however it is hard to argue that gentle exercise, improved nutrition, and mental purpose does not positively impact patients of all functional levels
- **Standardized treatment** regimens for specific diagnoses would be helpful
- Given its broad reaching themes and effects across multiple diagnoses, **rehabilitation professionals should consider incorporating therapeutic horticulture** in the care of patients with trauma-related stress and as part of a comprehensive rehab program









# Why is this important?

- Chronic diseases are the leading causes of death and disability in the United States
  - “As of 2012, about **half of all adults**—117 million people—had one or more chronic health conditions. **One of four** adults had two or more chronic health conditions.”
  - **7 of the top 10 causes of death** in 2017 were chronic diseases. Heart disease and cancer accounted for nearly 48% of all deaths in 2010.
  - **Arthritis** is the most common cause of **disability**
  - **Diabetes** is the leading cause of **kidney failure**, lower-limb **amputations** (other than traumatic) and new cases of **blindness** among adults



## ■ Cost

- 90% percent of all health care spending in 2017 was for people with **one or more chronic medical conditions**
  - Up from 86% in 2010
- Total costs of **heart disease and stroke** in 2018 were estimated to be **\$330 billion**.
  - \$199 billion was medical costs, lost wages \$131 billion
- **Cancer** care cost **\$157 billion** in 2010
  - Projected to reach **\$174 billion by 2020**
- Total estimated cost of diagnosed **diabetes** in 2017 was **\$237 billion**
- Total cost of **arthritis** and related conditions was about **\$304 billion** in 2013
  - \$140 billion was for direct medical costs (\$81 billion in 2003)
  - \$164 billion was for indirect costs associated with lost earnings (\$47 billion in 2003)
- Total cost of Alzheimer's was an estimated **\$159-\$215 billion** in 2010; projected **\$379-\$500 billion by 2040**
- **Obesity** cost the US **\$147 billion** in 2009

\*adapted from [CDC.gov/chronicdisease](https://www.cdc.gov/chronicdisease)





**Eat food. Not too much. Mostly plants.**

- Michael Pollan

A garden is always a series of losses set against a few triumphs, like life itself.

– May Sarton

The glory of gardening: hands in the dirt, head in the sun, heart with nature. To nurture a garden is to feed not just on the body, but the soul.

– Alfred Austin

**Weeds are flowers too, once you get to know them.**

– A.A. Milne

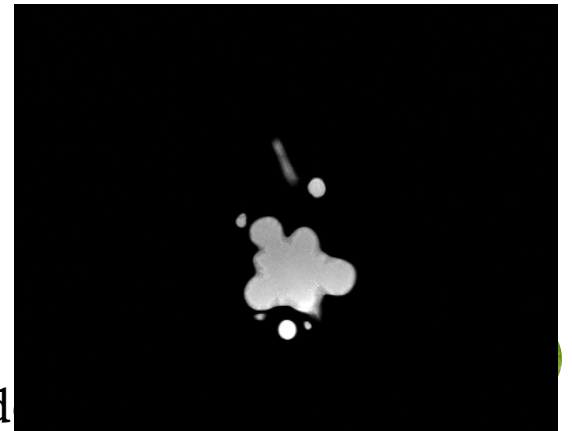
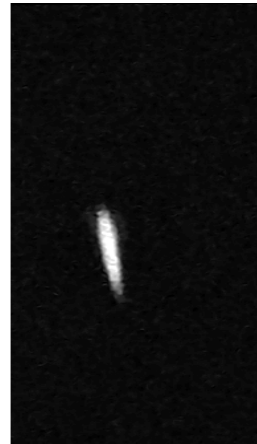
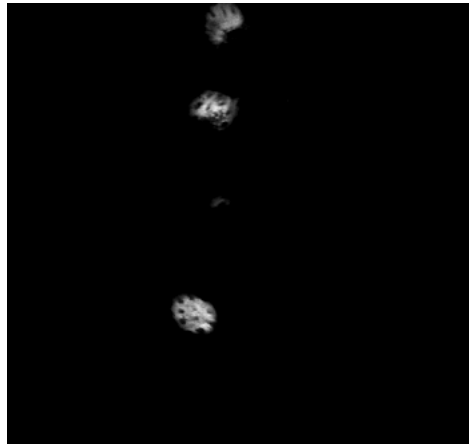
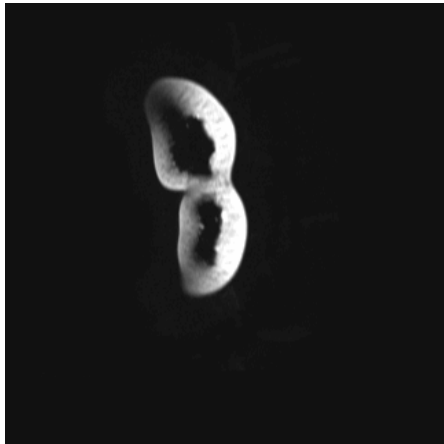
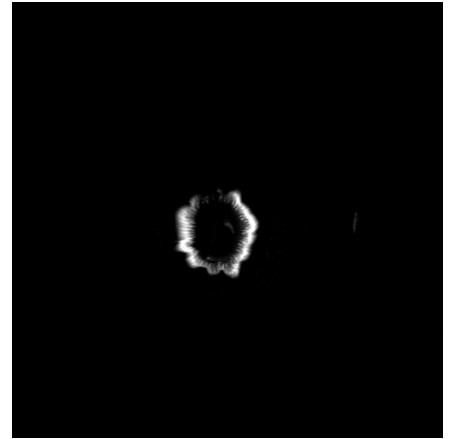
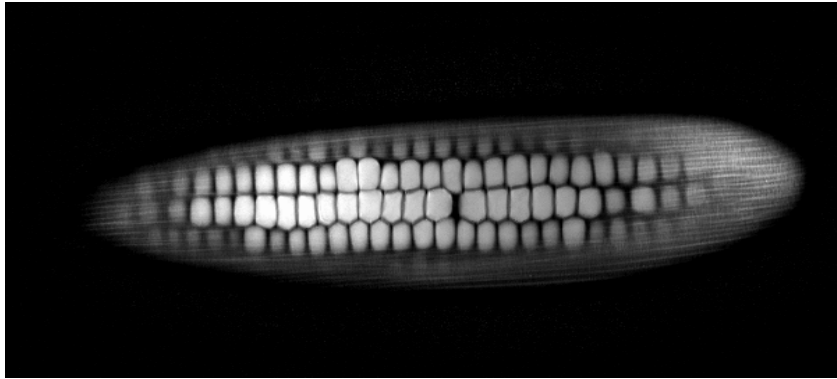
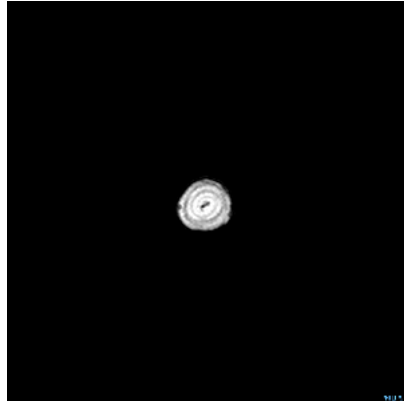
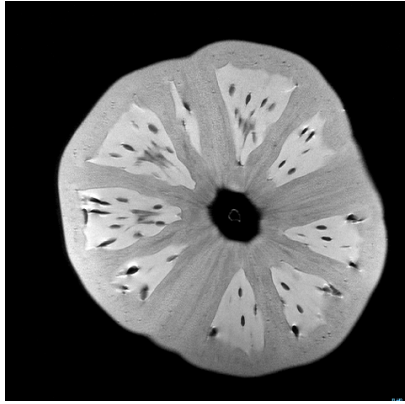


# Questions?

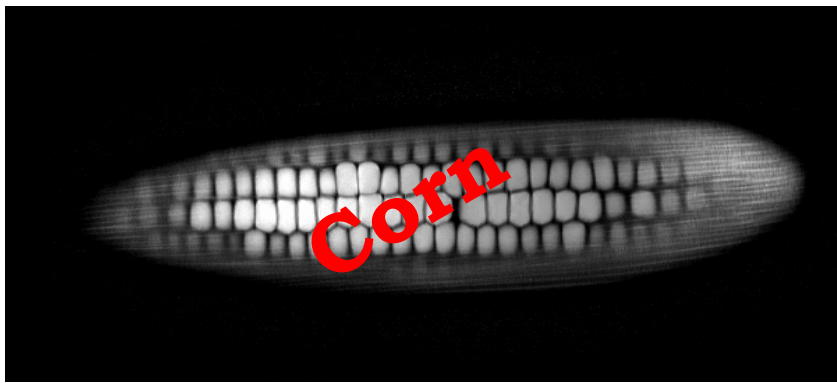
- Thank you all for your attention
- Please enjoy these plant-based MRIs



# Questions?

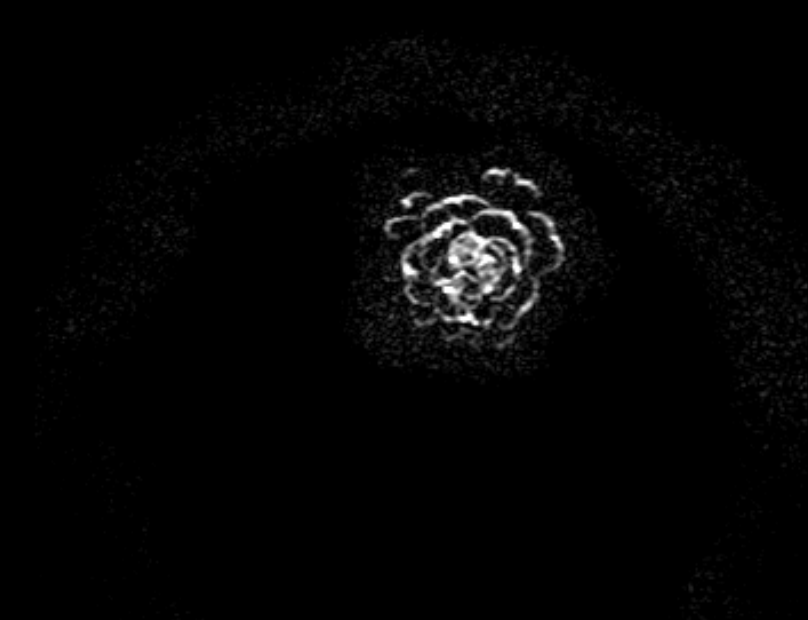
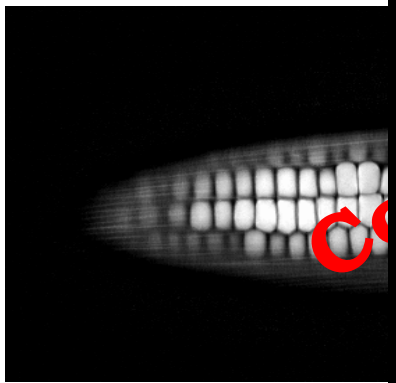


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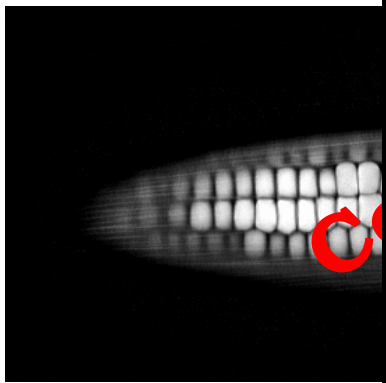
Tomato



Banana



Pineapple



Corn



Artichoke



Sunflower



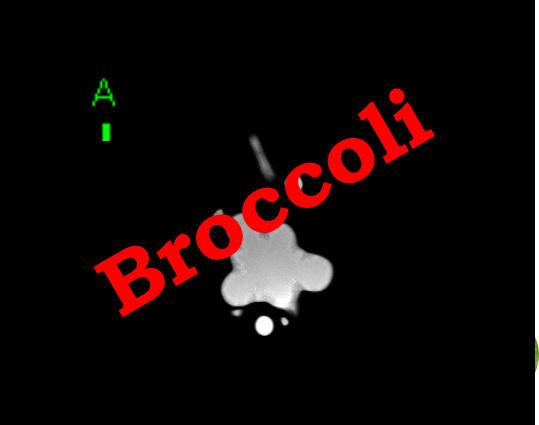
Bell Pepper



Strawberry



Okra



Broccoli

# References

- American Horticultural Therapy Association
- CDC.gov
- HealingLandscapes.org
- University of Minnesota Healing Gardens
- Google Image
- <http://insideinsides.blogspot.com>

