Bioscience Education and Research to Contribute to SDGs

Isaiah Kaunyangi Maina
MSc Medical Microbiology
JKUAT Kenya

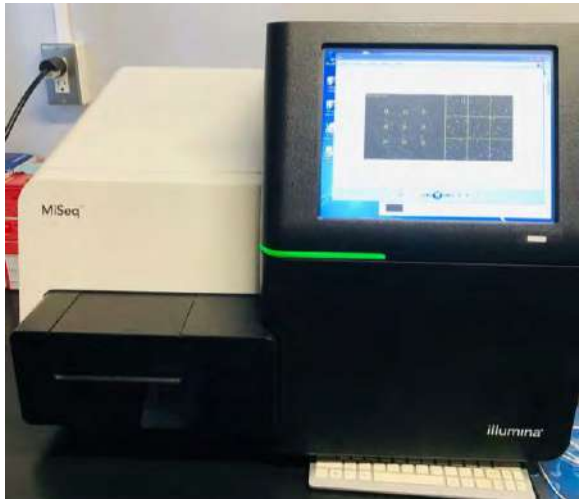
SAKURA SCIENCE Exchange Program

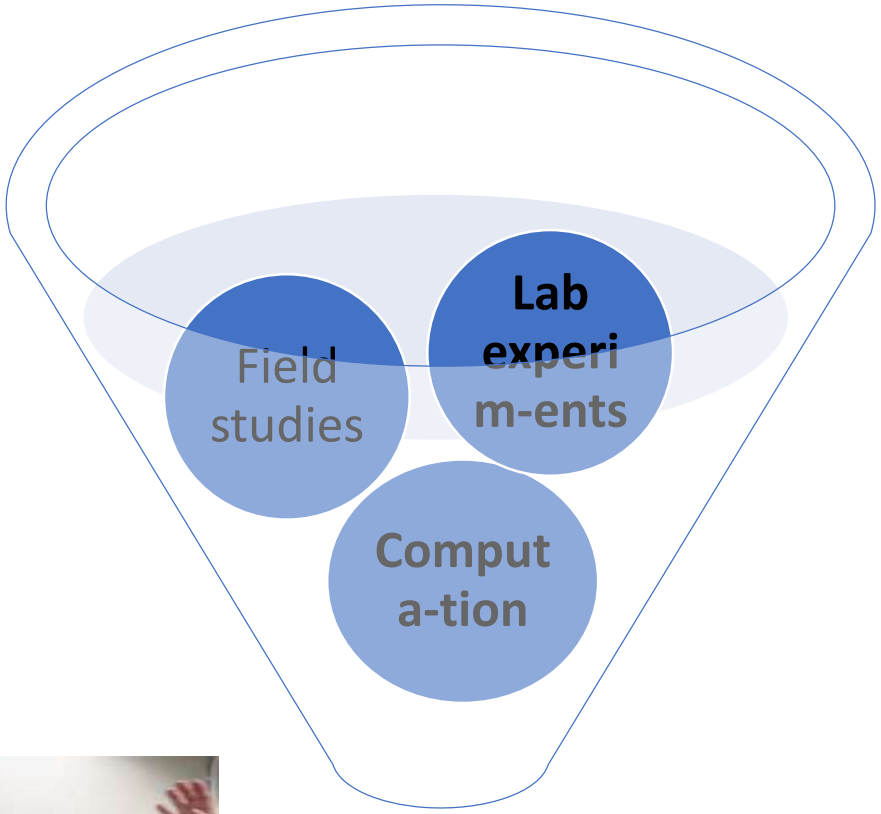
What is bioscience?

- Bioscience encompasses the study of living things and their interaction with each other and the environment.
- Bioscience research aims to understand the fundamental process that governing life.

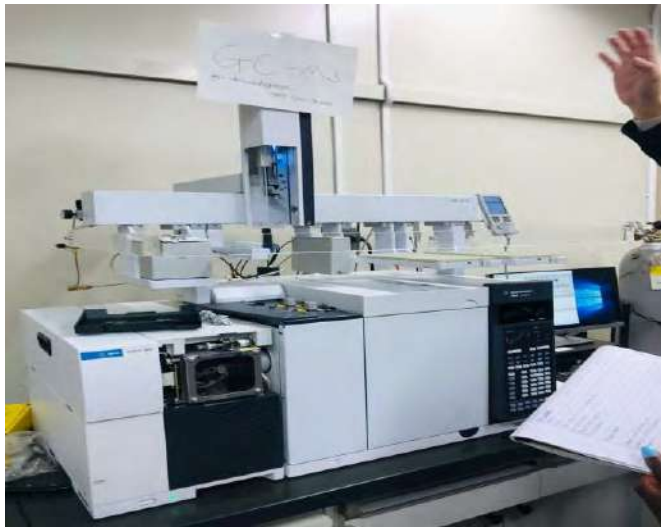
Bioscience research

- How?
  - Laboratory experiments
  - Field studies
  - Computation





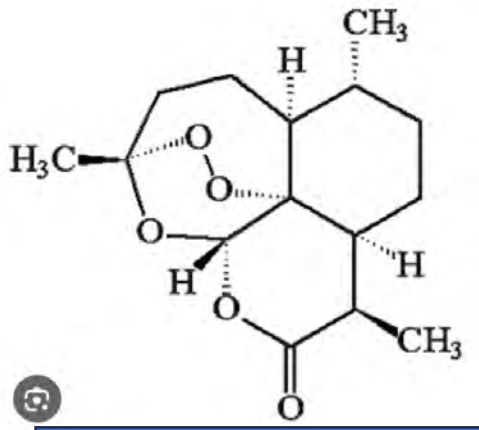
- Sustainable innovations in agriculture, food, and industry.
- New frontier in pest and disease control.
- Wealth generation



Products /New knowledge

Output

Natural product



Essential Molecule

Product

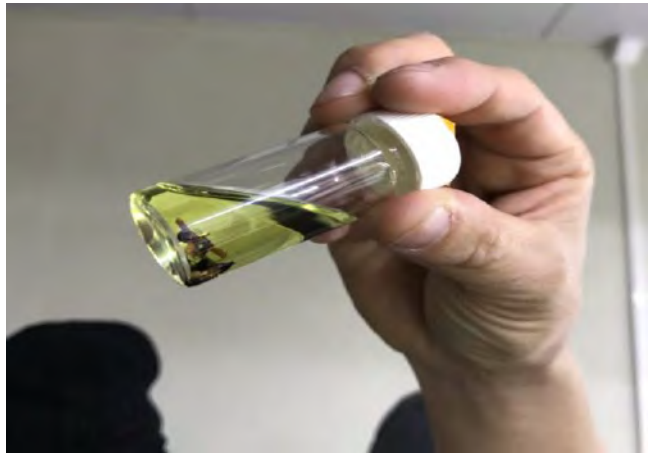
- Genetic studies continue to drive the discovery of novel genes with application in :

✓Application in agriculture

✓Medicine

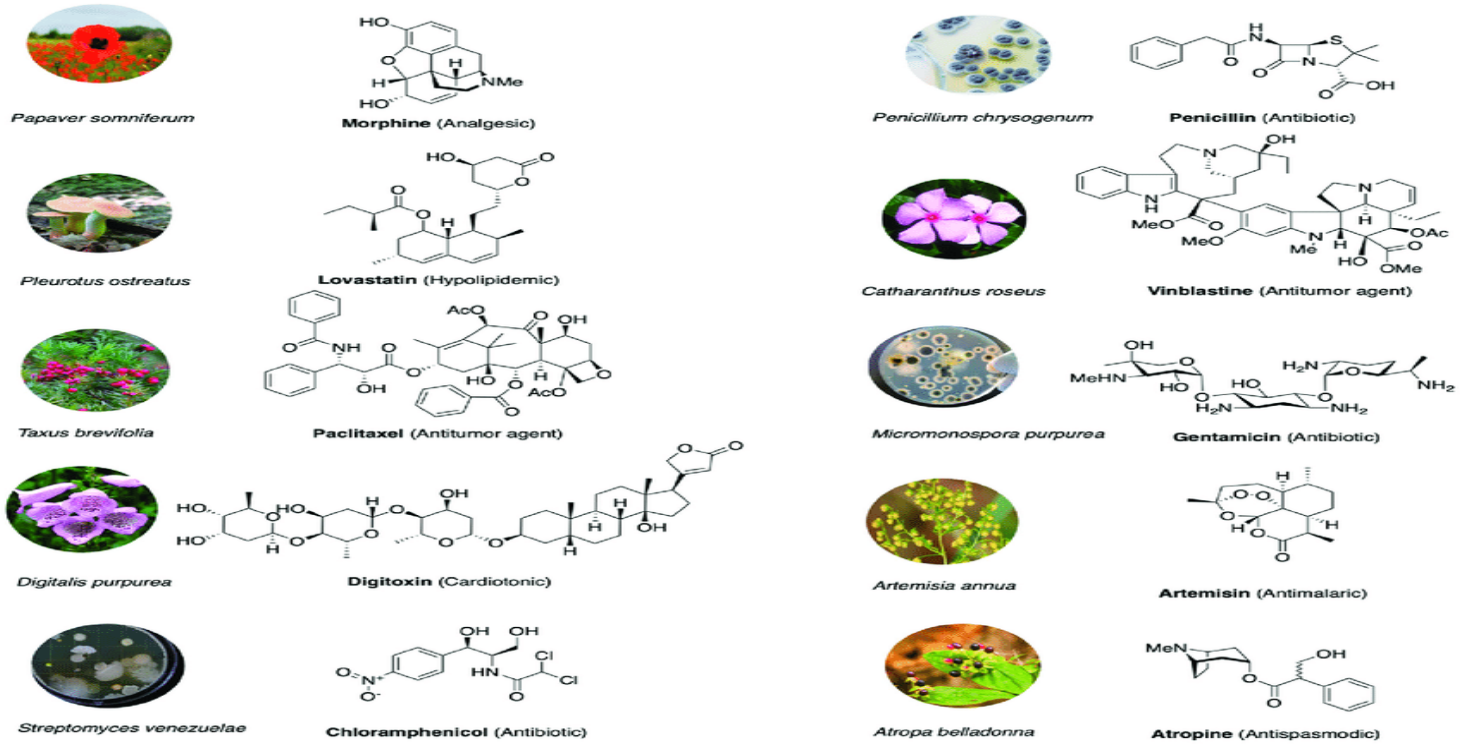
✓Industries

✓Other fields



Impact

- Feed the World (SDG 2)
- Conserve the environment (SDG 13)
- Alleviate poverty (SDG 1)
- Better treatment options (SDG 3)

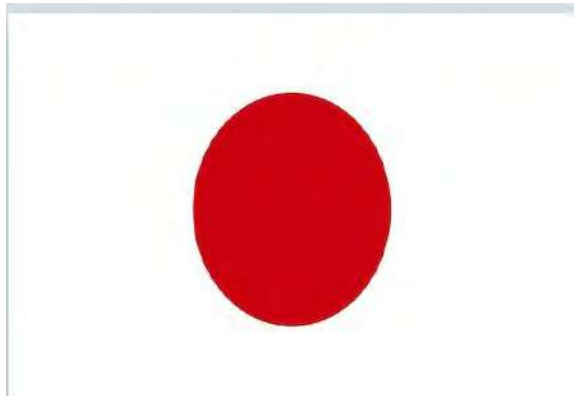


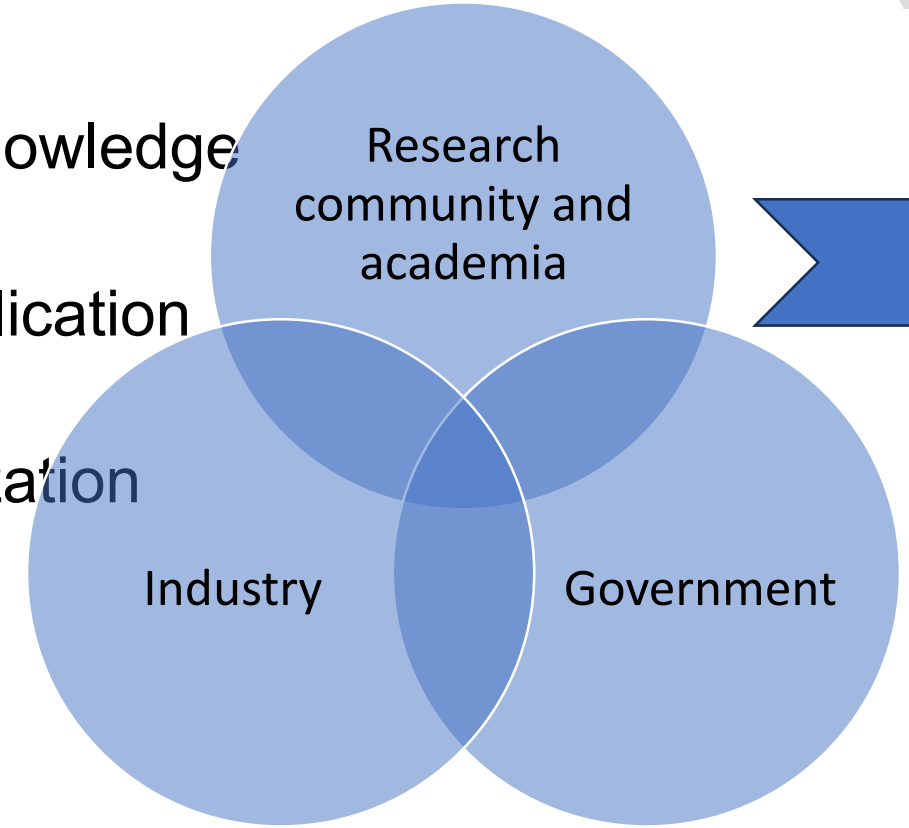
Tread

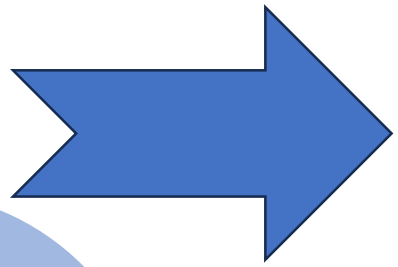
- The advancement of molecular biology and genomics will continue to generate a wealth of knowledge(Rahman *et al*., 2020).
- Post-genomic era will create new biotechnology products to boost the existing billion-dollar industry.
- Realization of maximum benefits in courtiers with better technological capacity and established links between academia, research, and industry.

Conclusion

- Collaborative approach in Bioscience research.
- Partnership
  - Sharing of Knowledge
  - Minimize duplication
  - Commercialization







Better world

References

- Rahman, M Masudur et al. “Biomedical research in developing countries: Opportunities, methods, and challenges.” Indian Journal of gastroenterology : official journal of the Indian Society of Gastroenterology vol. 39,3 (2020): 292-302. doi:10.1007/s12664-020-01056-5
- https://images.app.goo.gl/o7gDXnweZ1kGPiGS7


THANK
YOU

Acknowledgment

- Special thanks to:
  - The President of Utsunomiya University.
  - Faculty members Center for International Exchange Utsunomiya University.
  - The Professors in various centers of Utsunomiya University.
  - The Students Utsunomiya University.
  - Mr Kimathi Ringera

Sustainable Forestry Production at Utsunomiya University and Visit to the Experimental Forest – Dr Oshima

Jennifer N. Kago

JKUAT

Overview

- Funyu and Nikko forest.
- Established in 1937.
- Funyu(538 ha)- altitude of 260-600m.
  Trees- Hinoki cypress and Sugi cedar trees.
- Nikko(208ha)- altitude of 1390-1970m.

✓Natural Forest-Japanese oak, white birch, Northern Japanese Hemlock

✓Artificial Forest- Japanese Larch tree

International Forest certification and SDGs

Recognized as a forest that is managed appropriately.

Approved by SGEC in November 2014.

Strives to contribute to SDG by;

✓Training professionals.

✓Developing new forest management theories.

✓Advanced practical management.

✓Transmitting the latest info.

Sustainable Forest Management

- Silviculture=Healthy forests. Planting, weeding, pruning and thinning.
- Ensures wood can be used for future generation.
- Consider ecological, economic and social dimensions.
- Logs in UU were evaluated and acknowledged as the best in Tochigi prefecture.
- Yarding-moving felled trees from the slash pile to the landing or storage area. Cable yarding.
- Delimbing and bucking- processor

Mushroom cultivation

- Japanese oak tree.
- Log is cut during spring or autumn and stored at 20-25 degrees Celsius.
- Bed lock system.
- Shiitake mushroom- wood degrading fungi.
- ↑ 20cm.
- Served in Miso soup.
- Wasabi and chestnut are also grown.

Deep impression

- Beautiful city
- Clean environment
- Amazing food
- Observation of traffic rules
- Kind teachers and students

Japanese Quote;

✓Ki o ueru no ni ichi-ban yokatta jiki wa ni-ju-nen mae datta. Ni-ban-me ni ii jiki wa ima da.

✓Kono sekai no uchi ni nozomu henka ni, anata jishin ga natte misenasai

SAKURA SCIENCE Exchange Program

Dewa gokigen'yo

Asanteni sana

国立大学法人 宇都宮大学 UTSUNOMIYA UNIVERSITY

JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY
TECHNOLOGY FOR DEVELOPMENT

SUSTAINABLE DEVELOPMENT GOALS

Sakura Science Program Presentation

Sherry Brenda Macharia-MSc Animal Nutrition, JKUAT

SELF INTRODUCTION

- Name: Sherry Brenda Nyaguthii Macharia
- Affiliation: Jomo Kenyatta University of Agriculture and Technology
- Education: Chuka University, BSc Animal Science, currently MSc Animal Nutrition
- Research Interests: Evaluating the use of probiotics and organic acids in the growth performance, nutrient digestibility, carcass characteristics and hematological factors in broiler chicken.

TOSHOGU SHRINE

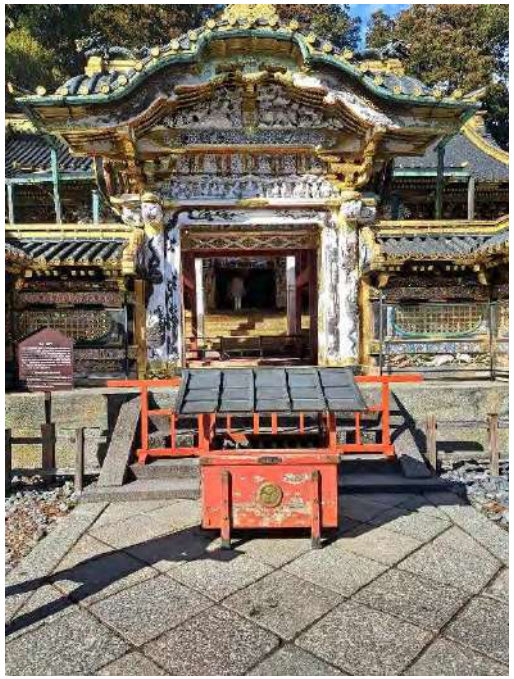
- Toshogu shrine is one of Japan's cultural heritage, located in Nikko town. It was established in 1617, built by Tokugawa Hidetada, second shogun of the Tokugawa dynasty.
- The town is renowned for its stunning natural landscapes, dense forests, and pristine rivers, making it a popular destination for nature enthusiasts and outdoor adventurers.
- Toshogu Shrine is dedicated to Tokugawa Ieyasu, the founder of the Tokugawa shogunate.

Architectural MARVEL

- The shrine had breathtaking architecture, intricate wood carvings, vivid colors and decorations.
- Yomeimon Gate- the most iconic and beautiful gate in Japan.
- Upside down pillar- carvings on one of the pillars to the left at the gate is upside down. Done deliberately so that the gate could not be considered complete.
- Sacred stable- captures the imagination with the famous depiction of the 3 wise monkeys, “see no evil, speak no evil, hear no evil”

CULTURAL IMMERSION

- Provided a window into Japan's feudal past and the legacy of Tokugawa Shogunate.
- Immerse in the shrine's rich cultural symbolism from the elaborate carvings depicting mythical creatures to the sacred rituals performed by the Shinto priests.
- Participation in traditional prayers and rituals, offering their respects to Tokugawa Ieyasu and seeking blessings for prosperity and good fortune.



HISTORICAL SIGNIFICANCE

- Toshogu shrine serves a living testament to Japan's studied history and the enduring legacy of it's rulers.
- Learn about the life and achievements of Tokugawa Leyasu.
- It is nestled amidst breathtaking natural beauty of Nikko National park.
- We got to explore moss covered pathways, iconic cedar trees, snow and Japan's splendor natural landscapes.

Educational EXPERIENCE

- We were offered valuable educational experience, learnt about Japan's religious traditions, architectural styles and artistic techniques.
- Gained all the history from electronic guides provided!
- Visiting Toshogu shrine was not just a sightseeing excursion but a transformative journey into the heart and soul of Japan's cultural identity.

ACKNOWLEDGEMENTS

- The president, Utsunomiya University
- International Exchange Center Utsunomiya University
- Professors in all the Laboratories, Utsunomiya University.
- Mr. Kimathi Ringeera
- Fellow Students.

Thank you!

Genome editing and Breeding of Crops

Paul Kitenge Kimwemwe

MSc. Plant Breeding

What is GEO (Genetically Edited Organism) ?

- A form of genetic modification and is a process by which the DNA sequence of an organism is modified or deleted. This is normally carried out to obtain desible effects such as modification of a protein, to produce a preferable phenotype or to prevent a problematic gene from being transcribed.

An organism whose gene is artificially modified from its original

How different is genetic engineering from GE

- Genetic engineering: includes modification, deletion of base or region of an organism's genetic code, and temporary or permanent insertion of a foreign DNA (**transgene**) from another organism.

In many countries, GMO has to go through a rigorous process before reaching the consumer.

GEO go through the same process in some countries but in others they are considered to be possible products of conventional breeding and therefore are able to reach the consumers more easly.

Gene editing techniques

- Gene konckout
- Deletion mutation
- Insertion mutation
- Substitution mutation
- Point mutation
- Gene knock-in

Risk of GMO and GEO

Difficult to predict what will happen, as the GMO was not present before

e.g. gene flow: weed near by the GM crop got herbicide tolerance.

Reduction in pesticide application resulted in the incements in other near by crops

Disadvantages of GM

- Growers should buy seeds from seed compagny every season, as GM are patented.
- Costumer choice only by price, may results in the selection of mass producer who produce GMO and small produce will disappear
- Ethical problem: can human modify other organisms ?

Experiment: measurement of nutritional components of fruit and vegetables

Aim: To find out whether the nutritional components of genome edited tomatoes and their original varieties have really been improved.

Material: Cherry tomato ‘Sicilian Rouge’ and its genome-edited version ‘Sicilian Rouge **High GABA**’

Spectrophotometer

Results :

mg/100g FW

GE tomato: 212.7 +/- 19.2

Original: 15.7 +/- 0.7

Thank you for listening
Go chōshu arigatōgozaimashita

VICTOR ROTICH

COUNTRY: KENYA

AFFILIATION: JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY (JKUAT)- KENYA

COURSE: M.Sc. ANIMAL NUTRITION

Research interest: Insect for feed and Food (INSEFF) BSF- Effects on immunology and gene expression- Nutrigenomics- ICIPE

UTSUNOMIYA FARM VISIT 5/3/24

Lecture by Dr. Hiroki Ikeda

- Located in Moka city – 25 min from Mine campus

➢ One of the largest university farm in Japan- 1,010,000m2

Crops in the farm

- ❑Green onion
- ❑Chinese cabbage
- ❑Yudai 21
- ❑Radish
- ❑Cabbage
- ❑Cucumber
- ❑Burdock
- ❑Japanese pear
- ❑Onion
- ❑Grape
- ❑Blueberry
- ❑Japanese chestnut
- ❑Sweet potatoes
- ❑Tomato

Horticultural crop Research

❑Conducts basic Research on Tomatoes and onions

➢From Field trials to genetic analysis

- Horticultural Science – Dr. Kurokura
- Plant breeding Laboratory
- Applied entomology lab- Dr. Sonoda
- Plant Pathology Lab – Dr. Natsuaki and Dr. Neriya

Onion Production in the Farm

- Onion consist of the root, stem, bulb and leaves.
- We consume the bulb- Productivity determined by degree of enlargement of the bulb.

❑Sowing – Mid September

❑Planting – Early November

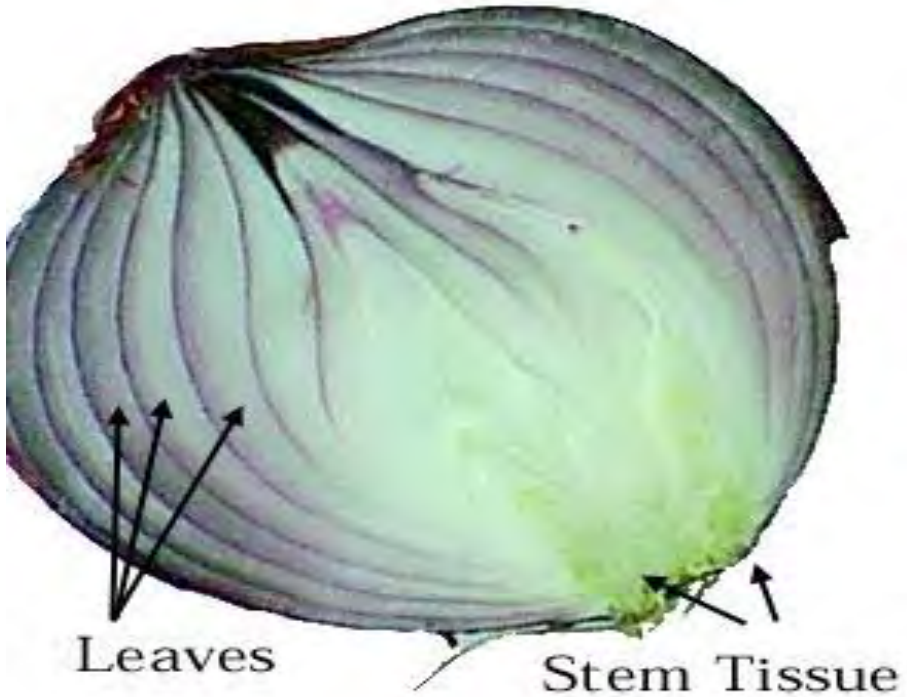
❑Harvesting – Early may to mid June

➢Bulb enlargement increases with temperature

Research About Onion Production

- Commonly Known

✓Bulb enlargement increases with photoperiod and temperature



- Unresolved questions

✓Which is more crucial between day length and temperature?

✓Where are the effects of the two sensed?

✓Which genes are involved in the process?

❑Extracted RNA and synthesized cDNA to identify expression ACFT1 and ACTF4 genes

Conclusion

- Size of the bulb has an impact on yield
- Temperature and day length has an impact on bulb enlargement
- Utsunomiya university farm aims at engaging in research that contributes

Acknowledgement

宇都宮大学
UTSUNOMIYA UNIVERSITY

SAKURA SCIENCE Exchange Program

JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY
TECHNOLOGY FOR DEVELOPMENT

icipe

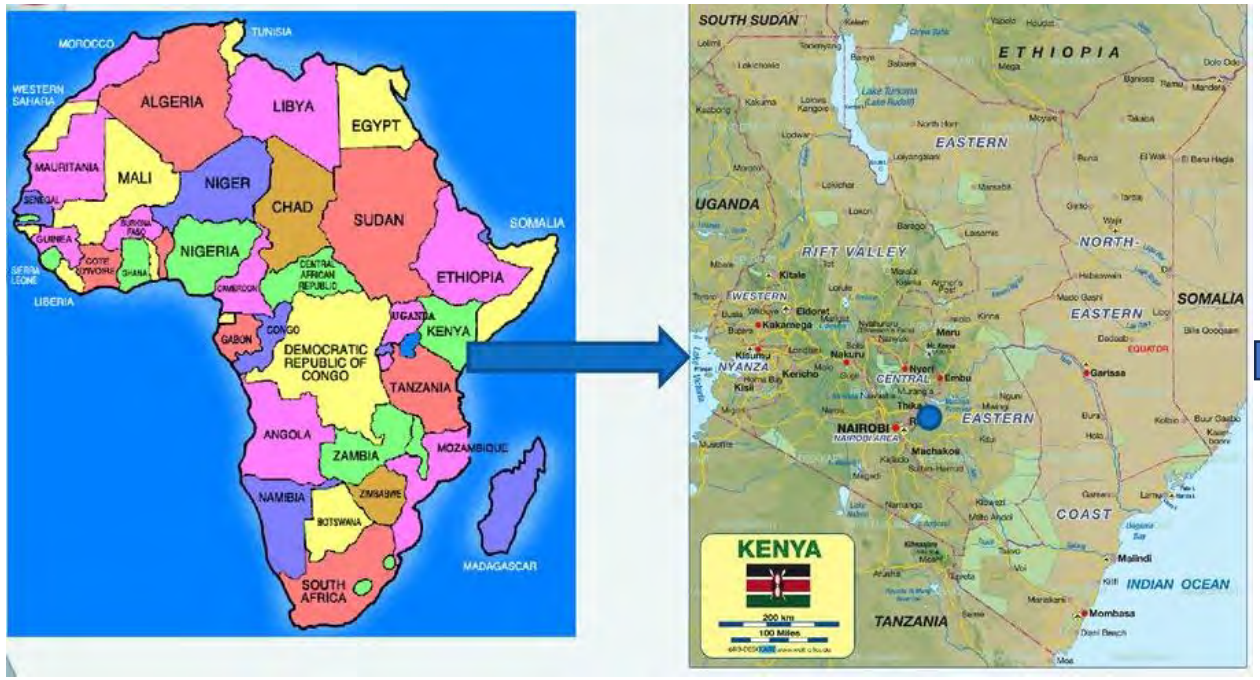
THANK YOU

Experiment: Investigation of onion growth and analysis of gene expression

Paul Ojwang Ajwang
MSc. Botany

Where I came from

My current location



Kenya to Japan, Amazing

Introduction

Experiment by:
Hiroki **IKEDA** (Associate Professor)

AIM

- To examine whether bulb enlargement at the genetic level has commenced in onions with different number of leaves

SAMPLES

Small onions	Large onions
	

Experiment Overview

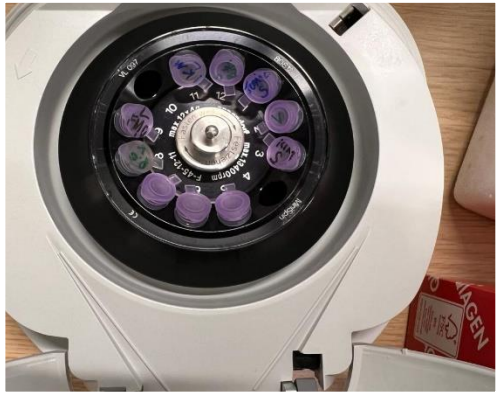
Procedures conducted

- RNA extraction from onion leaves.
- Synthesis of cDNA from the extracted RNA – RNA is unstable.
- RT-PCR using cDNA as template.
- Gel electrophoresis.

Consumables and Equipment

Micro pipette

Centrifuge



Working area

PCR Thermal cycler

Others

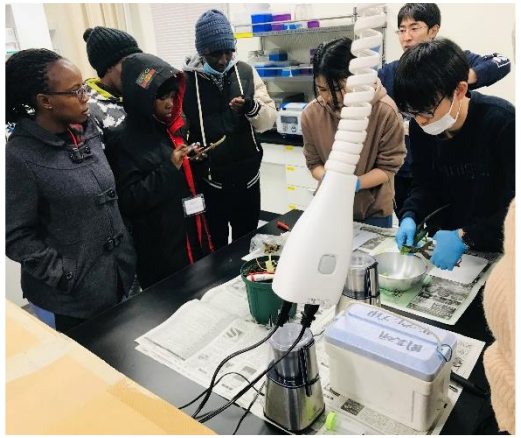
- RNA extraction Kit
- Buffers
- Liquid nitrogen
- Electric grinder
- Among others

Lessons learnt:

- Good lab practice when using the equipment
- Caution when using centrifuge
- Operating the equipment

Sample preparation

Students observing keenly



Liquid nitrogen added

Cutting onion leaves into small pieces

Grinding onion leaves

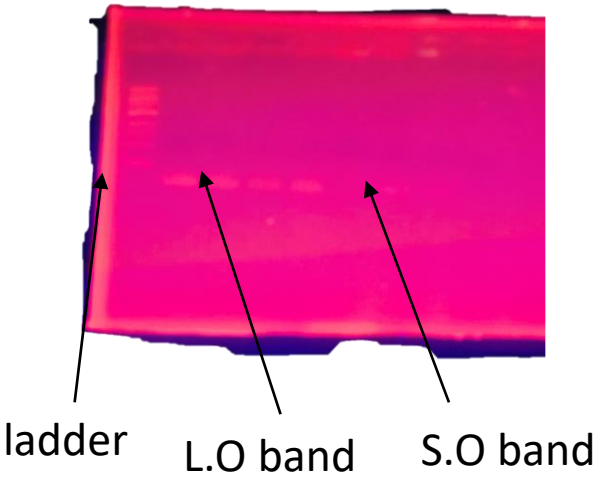
Sakura Science program students conducting experiment

Explanation before experiment

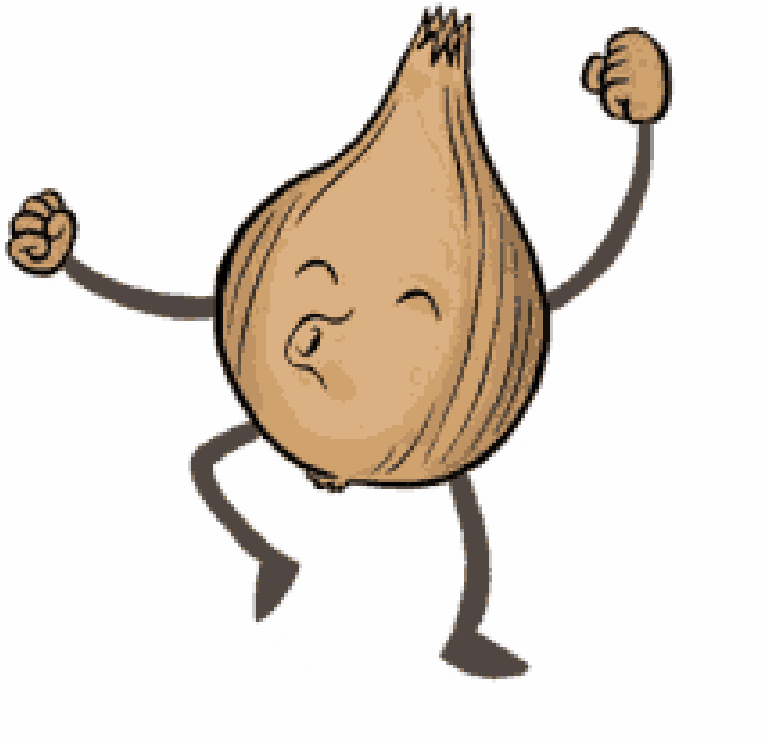
RNA extraction procedure

Loading samples for gel electrophoresis

Bands



Experiment successful: very happy



Impression and expression of SSP

- Exposure to advanced lab facilities, research and lectures on various topics (Quality education – SDG 4)
- International cooperation and knowledge exchange between the countries represented and Japan (Partnerships for the goals – SDG17)
- I am not the person I was last week in terms of knowledge and experience
- Got to experience Japanese culture – So far Healthy set and Gyoza still ranks among the best I have eaten, yet to test Sushi

Special thanks to:

1. Prof. Natsuaki – for being with us throughout the day since day 1
2. Dr. Ikeda – for taking us through the lecture and experiment
3. Riku and Ayaka Tabei – for helping during the experiment
4. And of course everyone in this photo for ensuring that the experiment was a success

Acknowledgement

ASANTE

DIAGNOSIS AND DETECTION OF PLANT DISEASES

Sakura Science Program

FATMA MOHAMED OMAR

MSc. Biotechnology

Various plant pathogens

Fungi

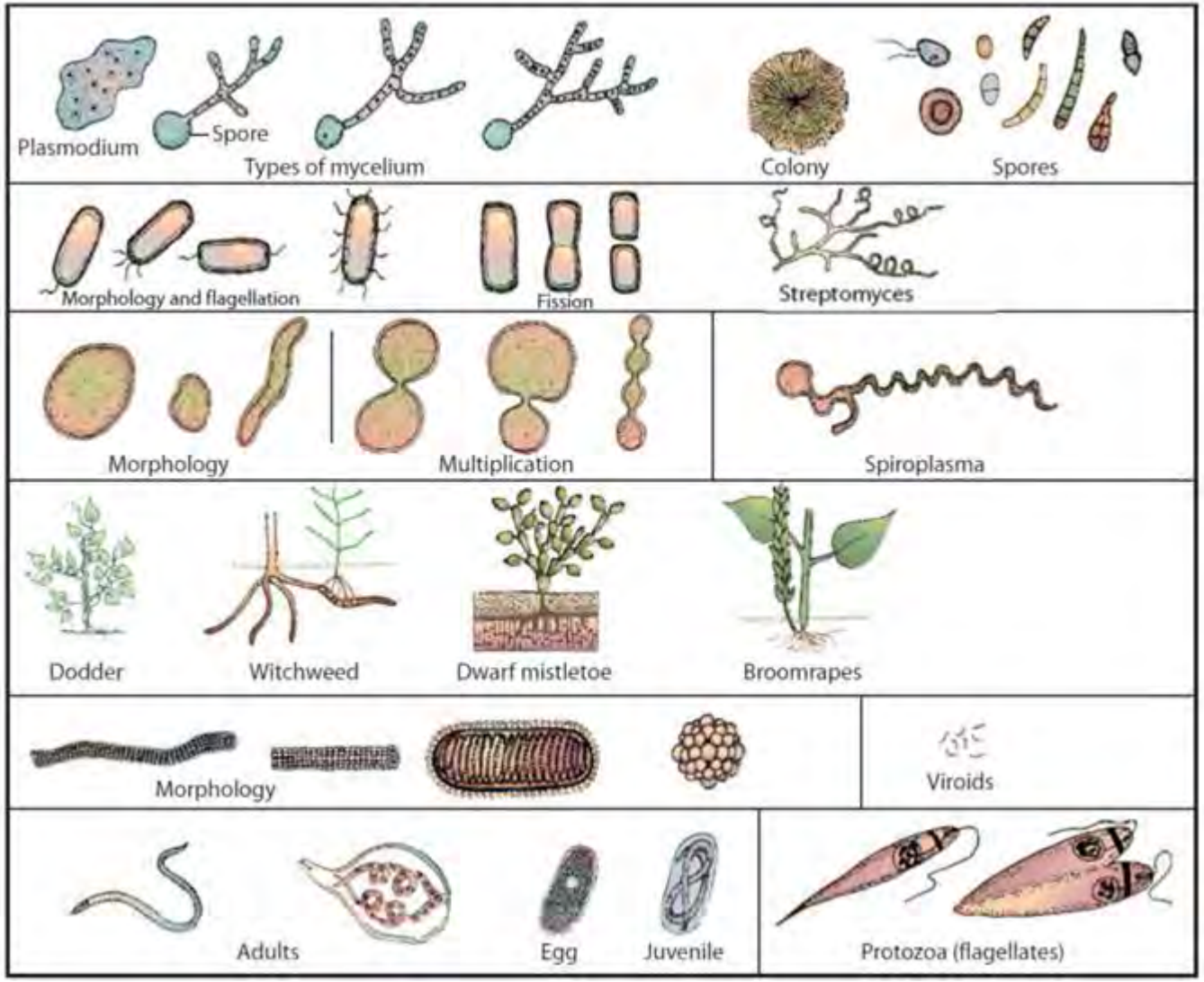
Bacteria

Phytoplasma

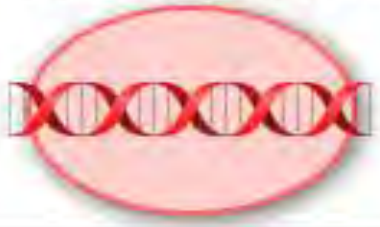
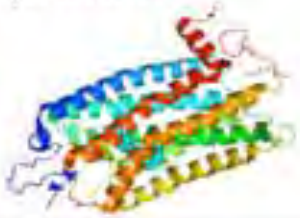
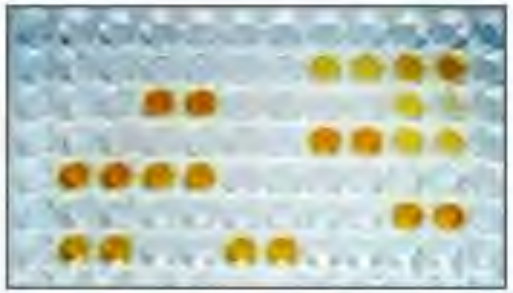
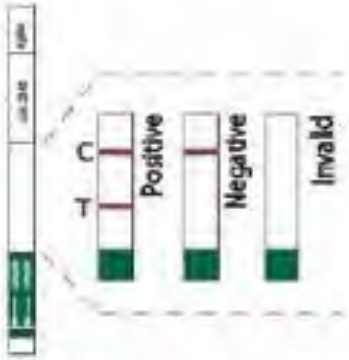
Weed

Virus

Nematode



Diagnostic method

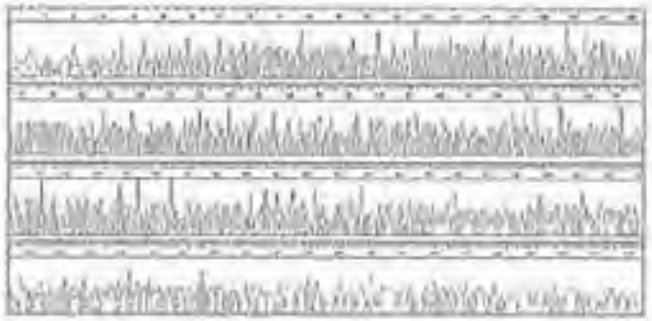
target	pathogen	Nucleic acid (DNA/RNA)	protein
			
method	 microscope	 PCR	 ELISA
	 culture medium	 LAMP method	 immunochromatography

DNA Sequencing

DNA sequencer

(Adapted from Life Technologies' website)

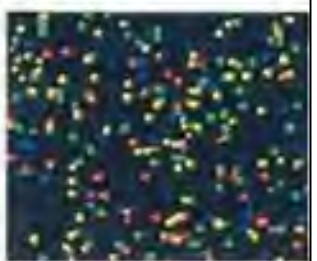
- Reads one DNA fragment at a time
- Typically longer sequencing times
- Lower throughput



Next Generation Sequencer

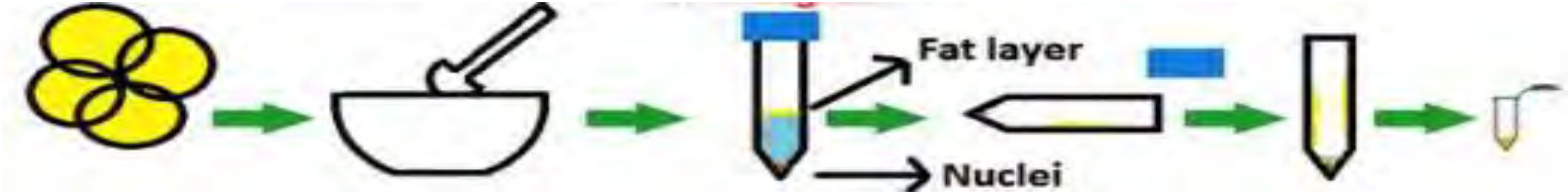
(Illumina, MiSeq)

- Employs parallel sequencing
- Reads multiple DNA fragments simultaneously
- Faster sequencing times
- Higher throughput



(From Illumina MiSeq materials)

Detection of RNA virus (CMV) by one step RT-PCR



50mg of infected *N. Benthamiana*

Add 500 µl PBST & grind well

Transfer all sap to small tubes, leave for 10 min a.r.t. Discard all crude sap

Add 50 µl PBST & wash by pipetting, discard all sap **X2**

Add 20 µl RNase-free H2O & mix by pipetting

Add 1 µl of the RNA into a small PCR tube plus 9 µl RT-PCR reagents to make vol of 10 µl

Reaction of 30 cycles

1.2 µl dye, amplicon, mix, load into 1% agarose gel TAE buffer

Stain with ethidium bromide for 10 min & observe gel by trans-illuminator

Detection of RNA virus (CMV) by ELISA

50mg of infected *N. Benthamiana*

Add 500 µl PBST & grind well

Pick 200 µl of the mixture & add to the microplate

Incubate overnight at 4 °C

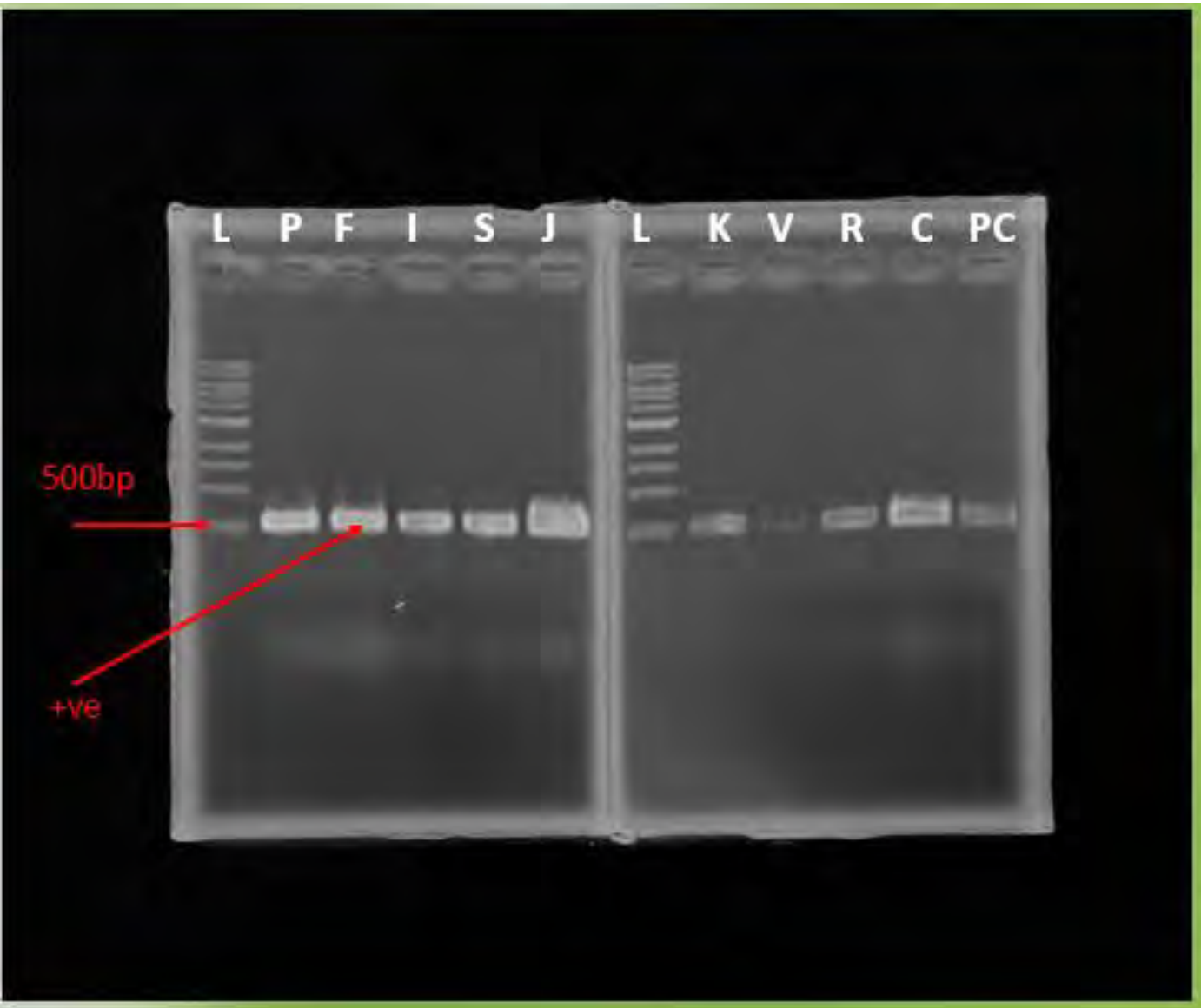
Remove solution & wash twice
Add antiserum(CMV & rabbit-goat IgG)
Wait for 1 hr

Remove antiserum
Wash three times with washing buffer

200 µl of substrate solution, allow color dvlpt a.r.t in dark for 30 min

View

Results for RT-PCR & ELISA



Take home message

- Cross-validation of the results obtained from each method, enhancing the confidence in the accuracy of virus detection
- PCR detects specific nucleic acid sequences of the virus offering high sensitivity and specificity for virus detection.
- Comprehensive and integrated approach to virus diagnosis, enabling more effective disease management strategies
- The inclusion of positive or negative controls
- How to effectively load samples into the gel
- Simplified kits for extraction & PCR

Acknowledgement

Utsunomiya University, School of Agriculture
Laboratory of Plant Pathology

Dr. Yutaro Neriy
Prof. Natsuaki

Further questions/discussions
Connect

- ✓ GitHub: Fatma366
- ✓ LinkedIn: Fatma Mohamed Omar
- ✓ Slack: Fatma Omar
- ✓ X: omar_fatma99

Sakura Science Exchange program

by:

Stephen katana cosmus

MSc. Medical Microbiology

Vaccines?

- These are biologically engineered formulations designed to stimulate the immune system, providing targeted protection against specific diseases by mimicking natural infections without causing illness.

Brief History into vaccination:

Edward Jenner → Development of the first small pox vaccine (14th May 1796).

Immunity

Immunity?

- Immunity is the body's ability to resist and defend against infectious agents.

Types of immunity

- Innate
- Adaptive

What of immunity in plants??????

Cross protection

- Defined as Immune defense against related pathogens due to prior exposure.
- Example in Tobacco plants where systmatic infection with one strain of TMV repressed the infection with another (McKinney *et al.*, 1929).

Immune and Vacccine in plants:

- Plant immunity relies on intricate molecular processes that activate defense mechanisms against various pathogens.
- Plant vaccines are designed to bolster this natural immunity, providing a sustainable approach to protect crops and enhance agricultural resilience.
- These innovative solutions aim to mitigate the impact of diseases on plants, contributing to global food security and sustainable agriculture.

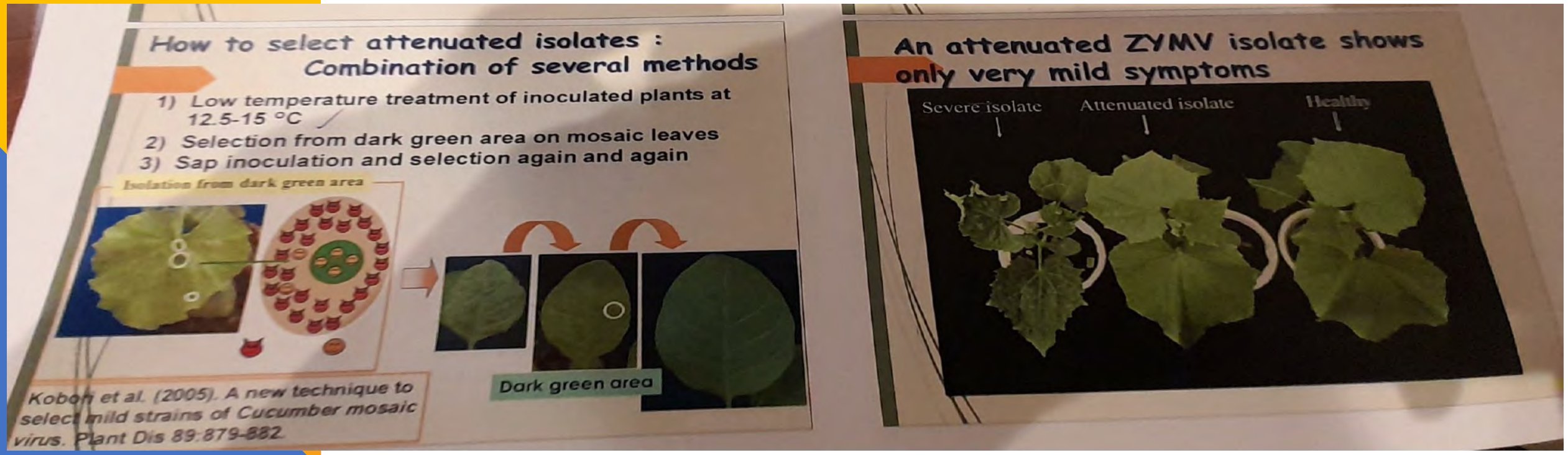
Viral attenuation and cross protecton to control plant viral diseases

- Viral attenuation involves weakening the virulence of plant viruses to develop less harmful strains.
- Cross-protection is a strategy where plants are pre-exposed to a mild strain, inducing immunity and providing resistance against more severe virus strains.
- Collectively, serving as effective methods to control and manage plant viral diseases.

Selection methods of attenuated viruses

- Search for naturally occuring mild strain.
- Treatment of infected plants with high (>35^{0}C) or low temp (15^{0}C).
- Exposure to mutagens such as UV light or nitrous acid.
- Exchange or addition of RNA components in vitro or in vivo.

Hot or cold treatment ussually effective in inducing viral attenuation.



protective inoculation

- Protective inoculation involves administering a substance (attenuated pathogen), to
- Stimulate an immune response and establish immunity against a specific disease, providing protection upon subsequent exposure to the pathogen.

ご聴取ありがとうございました

Go chōshu arigatōgozaimashita

Stephen Katana Cosmus
+254718445925
stephencosmus@gmail.com

“Global Management 2023” of “Programme for Developing Human Resource to Contribute to SDGs by Merging African Potential and Japanese Scientific Technology”

SAKURA Science Exchange Programme

宇都宮大学
UTSUNOMIYA UNIVERSITY

JKUAT
Msc. Horticulture

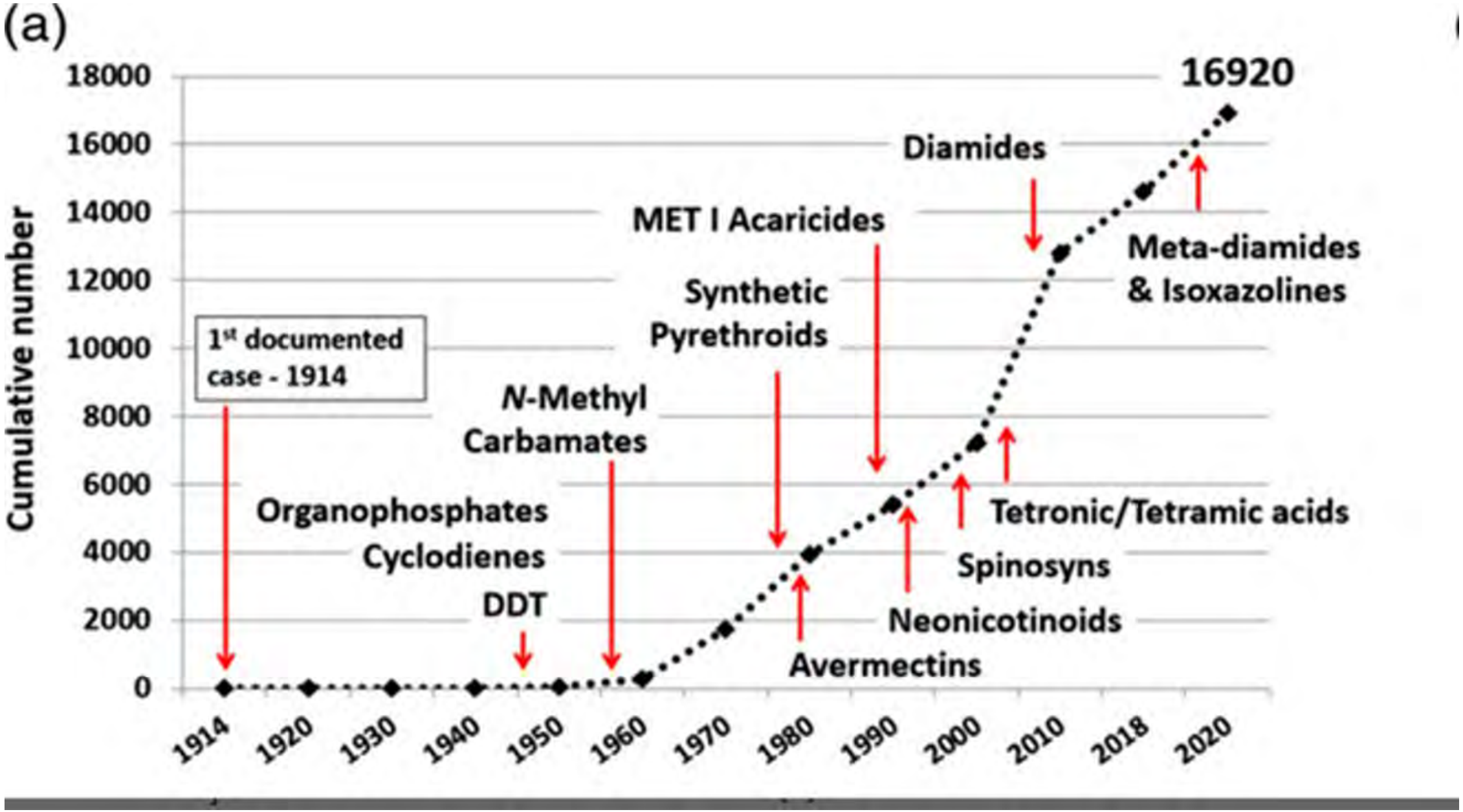
Project Diversity and Abundance of Insect Pollinators in Apple (*Malus domestica* Borkh) Orchards of Nyeri and Laikipia

Areas of Interest

- ❑Horticultural crops
- ❑Agricultural Entomology
- ❑Productivity

Agricultural arthropod pests showing resistance to pesticides and their management using Natural enemies

- Insecticide resistance is a long-standing problem affecting the efficacy and utility of crop protection compounds
- Insecticide resistance also impacts the ability and willingness of companies around the world to invest in new crop protection compounds and traits
- The Insecticide Resistance Action Committee (IRAC) was formed in 1984 to provide a coordinated response by the crop protection industry to the problem of insecticide resistance



Number of cases of insecticide resistance per decade and approximate dates of introduction for selected major classes of insecticides and acaricides (Sparks et al, 2021)

Top 3 insecticide-resistant pests

Species	Common name	Order	No. of active ingredients
Tetranychus urticae	Two spotted spider mite	Acarina	96
Plutella xylostella	Diamond black moth	Lepidoptera	96
Myzus persicae	Green peach aphid	Coleoptera	80

How does an insect become resistant ?

- Resistance occurs through mutations in the genetic make-up of the insect
- DNA which is made up of a chain of paired nucleotides is often described as the genetic ‘instruction book’ for constructing living organisms

- However, the replication of DNA is not a perfect process and errors can occur. These errors are called mutations

How does an insect become resistant ?

- As the DNA provides the instructions for the development and function of the insect, a mutation can result in a change in insect physiology or biochemistry.

- Sometimes a mutation may have no impact on the insect, sometimes the mutation can be lethal.

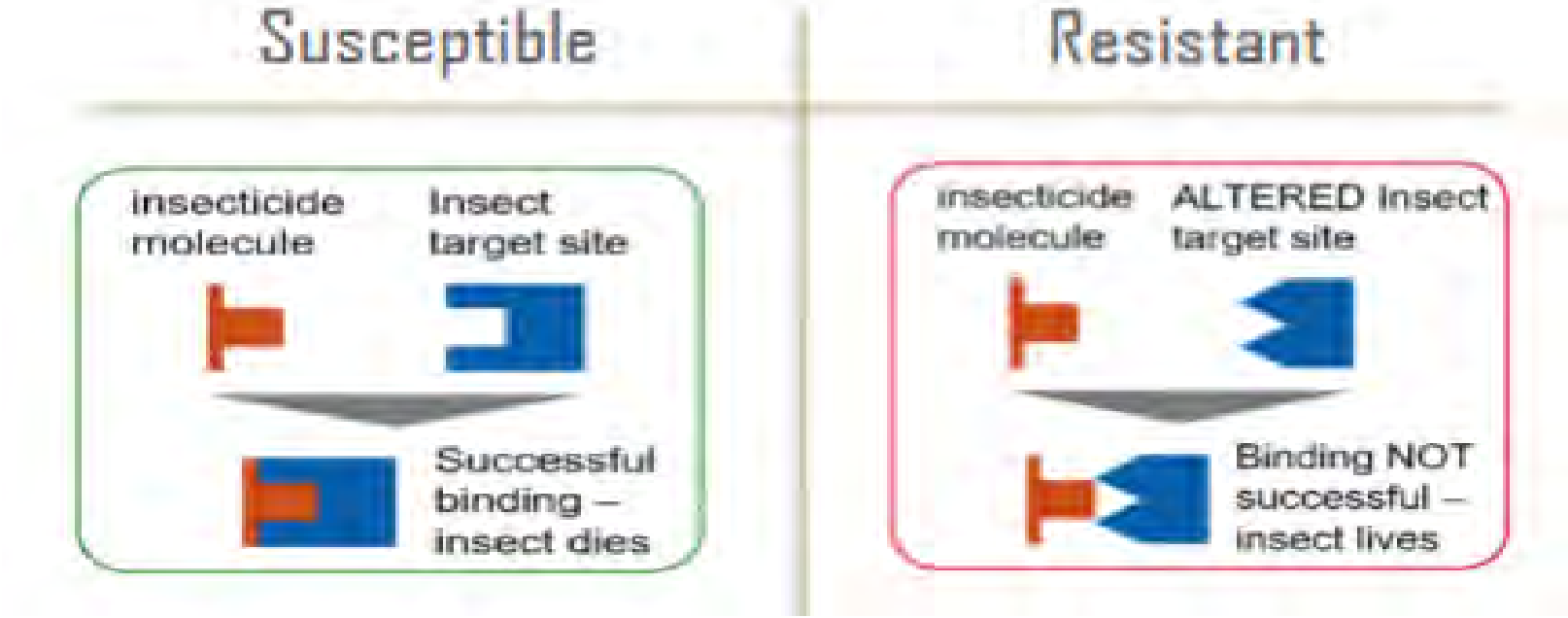
- However, on occasion the mutation may result in the insect becoming less susceptible to an insecticide and this provides it with a competitive advantage when the same insecticide is applied again.

Mechanisms of Resistance

1. Increased activity of detoxification enzymes

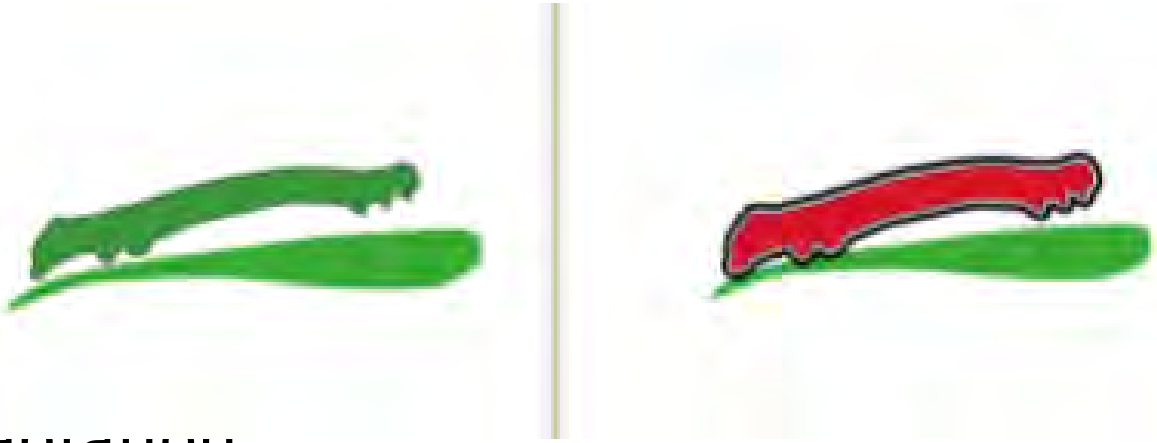
Cytochrome P450,carboxyl esterase, glutathione S-transferase

2. Target site insensitivity- insecticides generally have a specific site of action within an insect, this is usually a receptor protein



Mechanisms of Resistance

3.Reduced penetration of body surface (physical adaptation) such as a thicker cuticle, extra waxy covering, or faster excretion of waste

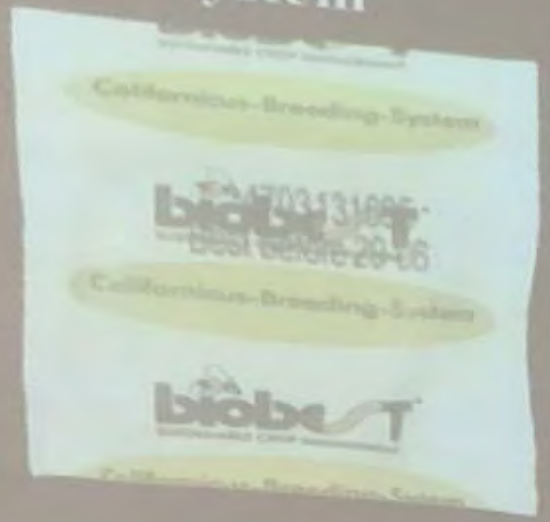


4.Behavioral adaptation

Spider mite control using predator release systems in a Japanese pear greenhouse

- Installation of a slow-release sachet containing *Neoseiulus californicus* (McGregor) (Acari: Phytoseiidae) protected by a waterproof shelter on the pear stem
- Monitoring the efficacy of the predator release system for spider mite control at a Japanese pear greenhouse requires discrimination of N. *californicus* from other indigenous phytoseiid mite species inhabiting the study site
- Results demonstrated that approximately 1 month is necessary for the distribution of the released N. *californicus* on the leaves
- The effectiveness of the predator release system in Japanese pear outdoor orchards also remains to be evaluated

Predator release system



Commercialized *N. californicus* that have ingested food mites and multiplied are released for a long period

Resistance Management

IPM considers all available techniques which are economic, safe, and environmentally-sound to reduce pest populations. IPM practices do not exclusively rely on insecticides, hence insecticide resistance selection pressure is reduced and the risk of resistance minimized.

A Pest Thresholds

a) Monitor pest species and natural enemies
b) Make rational pest control decisions

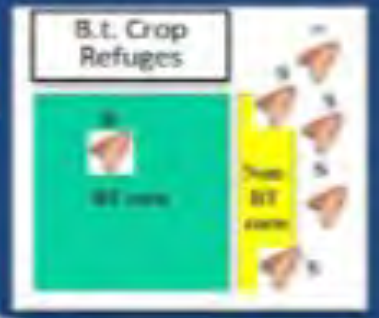
C Biological control

a) Artificially introduce or use natural enemies to reduce pest populations.
b) Manage cropping to encourage beneficial species
c) Consider alternative microbial insecticides

IPM

B Agronomic practices

a) Crop rotations
b) Crop-Free periods
c) Clean-up infested crop residues
d) Use resistant crops
e) Include non-treated refuges



D Chemical control

a) Use selective insecticides responsibly and rotate MoA
b) Apply insecticides when effects on beneficials are minimal
c) Consider alternative application systems e.g. granules, seed treatment, traps

Arigato gozaimasu!

Utsunomiya University
JKUAT
All Faculty
UU-A team
UU international
Studies students
Sakura Science team
Organizers

A general review of the 2024 Sakura Science Program at Utsunomiya University

Ms. Naomi Chelimo Ketter

Coordinator for exchange activities in
the College of Agriculture and Natural Resources, JKUAT

Lecturer, Dept. of Horticulture and Food Security,
Jomo Kenyatta University of Agriculture and Technology

Introduction

- An initiative by the Japan Science and Technology Agency (JST), started in 2014
- Aimed at fostering exchanges between Japanese and international youths who are the future leaders in the field of science and technology
- The program provides opportunities for outstanding students, researchers, and young professionals from countries around the world to visit Japan for a short period
- During their visit, participants engage in workshops, seminars, and hands-on activities at universities, research institutions, and private companies in Japan.

https://ssp.jst.go.jp/en/

Its objectives

To support the development of talented human resources from overseas who have the potential to contribute to innovation in science and technology.

To accelerate the international brain cycle.

To promote continuous collaboration, cooperation and interaction between Japanese educational and research institutes and overseas ones.

To strengthen good relationship between Japan and other countries and regions that will help science and technology diplomacy (cultural exchange)

Our experience

- ✓ Students have enhanced their scientific and practical knowledge, alongside being exposed to high tech and current research equipment
- ✓ Students have increased their networks both in UU, UU-A and the Sakura Science Club
- ✓ Open mindedness
- ✓ Continued engagement, i.e scholarships for their PhDs
- ✓ Will apply the knowledge
- ✓ Spiked collaborations

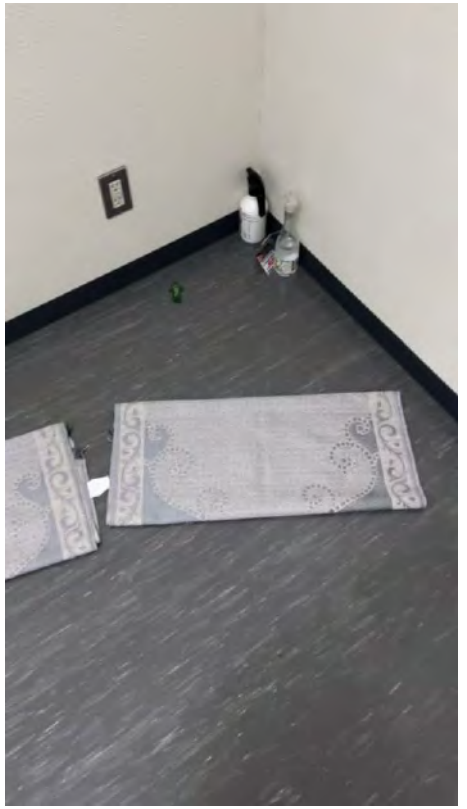
Recommendations

- ✓ The program to consider participants' fields of study
- ✓ Upon arrival, UU can provide a briefing on stay in Utsunomiya
- ✓ Consider having an online engagement on Japan & African academic culture and cultural awareness as a whole
- ✓ Consider having Sakura Science Program students to stay together with the UU-A students / within the dormitory
- ✓ Open the invitation to Bachelor students who will participate in the Global Management course
- ✓ Early communication needed on what the stipendium covers and what it does not cover so that the participants can know whether to carry extra cash or not

Photos_ Aha!!

Traffic lights

Snow



Prayer

Chapati madondo