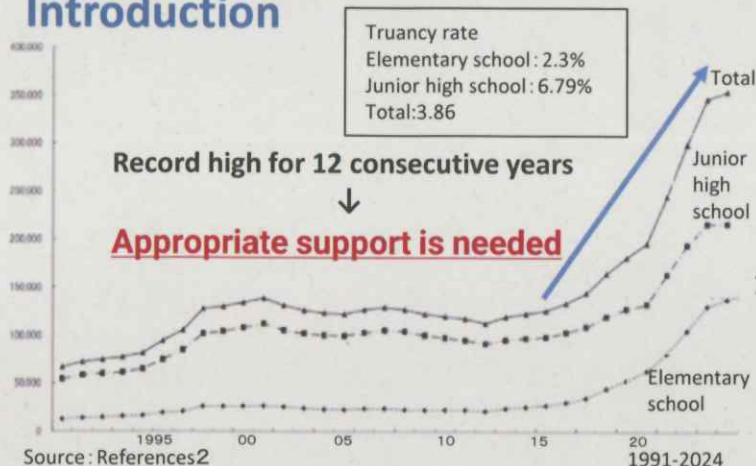


Preventing Truancy through Cooperation between School and Home

Meiwa Senior High School

Introduction



Background

- Truant students unable to access both safe place and learning space.
- Truancy is a problem that cannot be solved only by school or family.

What support methods can address these issues?

Target

- Identifying ways to create a safer learning environment through stronger parents-school connections.

Hypothesis

- Learning opportunities outside of school are effective in supporting truant students

Method

- (1) Interview survey on alternative schools
- (2) Literature review

Result(1)

The concern of Mr. Sago from Yuimaru Gakuen

Support decreases as children grow
→ Early social skills are important.

Not going to school is not the problem; losing human connection is.

Alternative schools ... effective but insufficient

→ Focus not only on aftercare but also on prevention is necessary

References

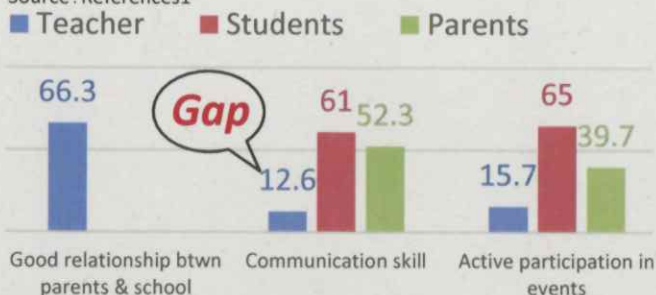
- [1] Research Report on the Analysis of Factors Behind School Non-Attendance Commissioned by the Ministry of Education, Culture, Sports, Science and Technology
- [2] Results of the Survey on Student Problem Behaviors, School Refusal, and Other Issues in Student Guidance for Fiscal Year 2024

Result(2)

Differences in recognition of protective factors

Protective factors... elements that promote recovery from difficult situations and stress

Source: References1



Discussion

Gap makes support incoherent

Try to reduce gap

Why does this gap arise?

Home & school observations differ



Share home information

→ School understand children more

→ Reduce gap

Proposal

Online Contact Sheet

- *For clarity, only the questions are shown. The actual sheet is an online form

- Q. How has the student been feeling this week?
(e.g. cheerful, calm, anxious, unstable, unsure, others)
- Q. How active was your child at home this week?
- Q. How much conversation did you have this week?
- Q. Is there anything you would like to share?
- Q. Who can this information be shared with?

If further action is needed...

- Three-party meetings
- Consultation with the school counselor

Future Plans

- The AI reads changes in the sheet
- Responses and notifies teachers serious conditions only
- Strengthens connections with parents with minimal effort

Lively Towns with Small Population

Introduction

Rural depopulation in progress due to urban population concentration.

For example...

- Shuttered shopping street
- Vacant houses
- Insufficient facilities



Kasugai city in Japan →

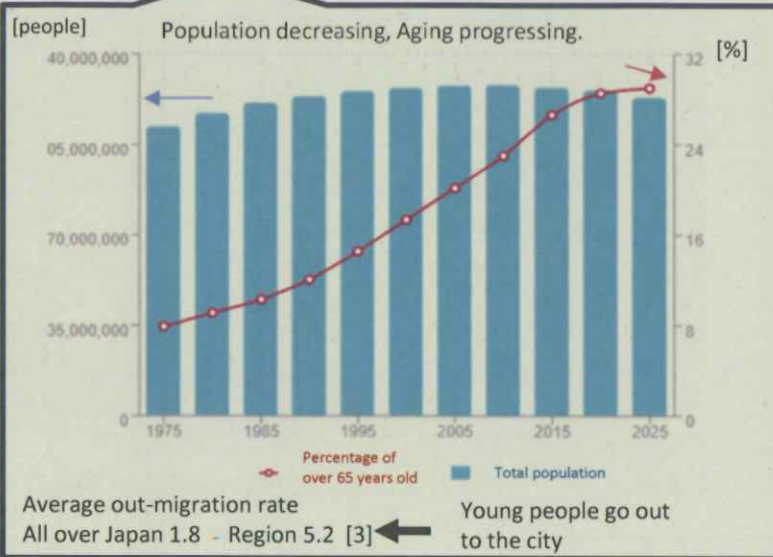
Background

In Japan

"Act on Advancement of Measures to Support Raising Next Generation Children"

"Regional Child-Rearing Measures"

→ To increase the number of children and population[1]



the world

Germany "Vacant land" into "Livable".
Norway & Finland Digital technology for inconvenient.[2]

Revitalizing region even if population remains small.

Strategy

To show model action for new regional revitalization.

Method

1. Set the model city
2. Research for students

Result

1. Set the model city

1	Toyone Village	52.409
2	Shitara Town	51.003
3	Toei Town	50.646
⋮		
9	Tsushima City	30.027
10	Seto City	29.888

the percentage aged 65 or over in Aichi top 10 [3]



The percentage of people aged 65 or over close to Meiwa high school.

→ Focus on Seto City and Tushima City

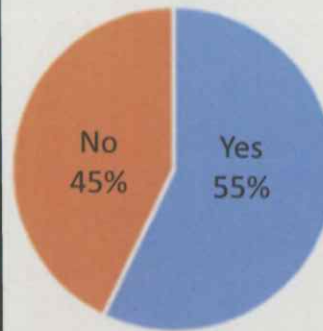
Depopulation revitalization [finding treasure underfoot] [4]

Selected Seto City that has traditional pottery, Setoyaki

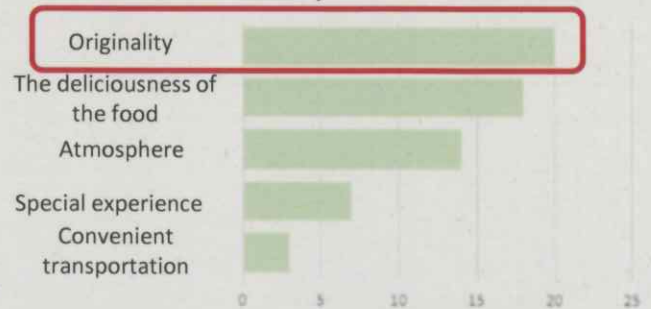
Meiwa Senior High School

2. Result of research

Do you know "Setoyaki", pottery that has 1000 of history?



What makes you go to the local café, not city café?



Proposal

"Seto Town Planning café"

- Use Setoyaki for café tableware.
- Workshop of remaking defeats of Setoyaki.[5]
- Hold Seto City contest.
- Donate part of the sales to Seto City

Method of proposal

Proposal by email from website of Seto City.

→ Cooperation with Seto Town Planning Company & get Setoyaki failures.[6]

Long Future Plan

Application of Seto City's action in other areas in Japan

→ Build the town that doesn't rely on population size.

Summary

- To find how we revitalize without increasing population.
- The originality is important to being people back.
- Make a proposal to Seto City & make it model for new regional revitalization.

References

- [1]Cabinet Office Chapter 2 Chapter 2: Future Vision for Population, Economy, and Local Communities (4) Measures for Declining Birthrate
https://www5.cao.go.jp/keizai-shimon/kaigi/special/future/sentaku/s2_4.html
- [2]Nandakanda store What's Smart Shrink?
<https://nanda.ryu-bow.com/2401.html>
- [3]e-Stat <https://www.e-stat.go.jp/>
- [4] Depopulation revitalization Tomi MATUBA
- [5]The Asahi shimbun
<https://www.asahi.com/articles/AST6V2HMTT6VUTNB002M.html?msocid=3f9b5de7b4446b5b06d8482db5716a35>
- [6]The website of Seto City Vacant house related
<https://www.city.seto.aichi.jp/docs/2020/03/31/00056/index.html>

Raising Awareness of Certification Labels and Protecting Forests!!

Meiwa Senior High School

1. Introduction



2. Background

How can we stop the illegal logging?

Avoid buying products made of illegally logged wood

Many people tend to purchase products unconsciously

<The reasons for low awareness>

- [1] Hard to understand the meaning when they saw the label.
- [2] Don't feel a connection to everyday life. etc.

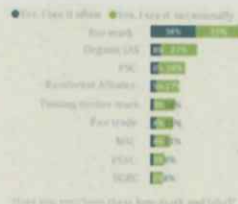


figure1 ②



figure2 ②

3. Target

1. Creating a label with a Catchphrase & a QRcode
2. Increasing practicality from a third party's perspective.

4. Methods

1. Clarification of issues and Organizing objectives
2. Consideration of design elements.
3. Consideration of Criteria for certification.
4. Improvement and Correction

5. Proposal



Image of the label(fig.3)

Material in the QR code (fig.4)→

What is CPF mark?? (Certified Protected Forests)

What is CPF mark?
This is attached to products that are made from harvested trees that comply with established laws (Forestry law and environmental protection law) and that take the factors of forests into consideration.

There are three main criteria for certification:
1. Checking logging permit and contract certification
2. Checking the process from logging to processing to finished products
3. Checking whether trees are being cut properly and sustainably

What are the benefits of buying this product?
The flow of money changes!
- Selling handmade products
- Consumer: Choose local logging
- Small business: can't get a profit
- Small business: declining

What will happen if illegal logging continues?
1. It causes the collapse of ecosystems. The people who live here could become unemployed as well in just a few years.
2. With the decrease in CO2 absorption, global warming progresses - floods and droughts become more likely.
3. A society where ecological balance disappears and those who follow the way are disadvantaged.

Each person's awareness protects the future. Shopping is a vote for the forest.

Thank you for reading until the end!

Can be used anywhere!	Can be used anywhere!
High standard 10% off	High standard 10% off

CPF(Certified Protected Forests)label

<Key Design Ideas and Points to note>

Shape, Color, Font

Contents: <Criteria for Certification>

1. logging permit and contract certification
2. Identification of the place of origin
3. Traceability
4. logging volume and methods

Comments by Kohno(FSC Japan)

○Regarding the current situation where there are **many labels**

○About New Perspectives

- What people really **focus on**
- Difference between **increasing labels** and making **existing labels understood**

6. Discussion

Figures 3 and 4 show that visual design and step-by-step information help people understand the certification more easily.

7. Future Plans

Thinking about what is necessary for practical application.

8. Reference

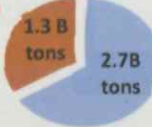
- ① <https://mirasus.jp/sdgs/biodiversity/6189>
- ② FSCグローバル消費者調査の結果 | Forest Stewardship Council

Turn Food Loss into Energy!

Meiwa Senior High School

1. Introduction

Food loss · Loss of power generation resources[1][2]



Reserves of Energy Resources



Produce energy from food loss

⇒ Solve two Issues at the same time

<Example>

- Biomass power generation
- Biogas power generation
- Microbial battery

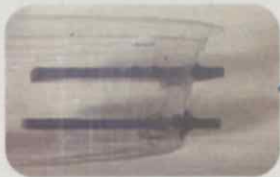
2. Target

Find a way to **generation higher electric power using food**

Investigating which type of food is the most suitable for microbial batteries

3. Method

Equipment production



A device in which the carbon electrode is placed outside the mud was used to enable accurate measurement of the electric current

Experimental procedure [3]

- ① Add water (100ml) and soil (20g) to the device and mix
- ② Input food
- ③ Wrap with a plastic
- ④ Add water (150ml)
- ⑤ Attach a clip to a carbon plate and measure

- (1) No food (2) Cabbage (6g) (3) Rice (6g)

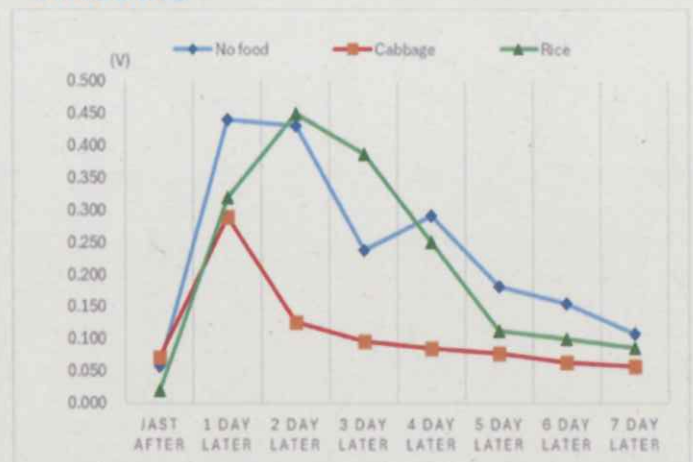


Water

Plastic wrap

Water and food

4. Result



Maximum value

No food: 0.440v

Cabbage: 0.289v

Rice: 0.450v

Power resistance: 1632Ω ~ 10360Ω

5. Discussion

Rice > No food > Cabbage

◎ Rice: Starch · Soft ✕ Cabbage: Dietary fiber · Hard

6. Conclusion

★ Ease of decomposition of food

⇒ A lot of starch · Soft

Power: 0.019mW ~ 0.12mW

LED: 20 ~ 30mW

Digital wristwatch: 0.001 ~ 0.005mW

Smart phone: 5000mW

Low-power devices



Practical potential

7. Future Plan

- Search for the best food
- Change the amount of food or mix food
- Design a system for recycling microbial battery waste through composting ⇒ **Recycling system**
- Exploring ways to improve the challenges of microbial battery (Low power generation efficiency, high cost, and instability)

8. References

[1] Food and Agriculture Organization of the United Nations
世界の食料ロスと食料廃棄

食品ロス関係業務 - 一般財団法人 大田区環境公社

[2] Japan Nuclear Culture Foundation

[Collection of nuclear and energy drawings]

[3] Information site of the sea and the earth JAMSTEC BASE

【夏休み自由研究サポート】電気を作る「電気微生物」を育てて「バケツ電池」で、電子オルゴールやモーターを動かしてみよう！ | JAMSTEC BASE



Using Microgrids to help Nagoya city become an SDGs Future City

Meiwa H.S.

▲ Relating SDGs goals

7 AFFORDABLE AND CLEAN ENERGY



11 SUSTAINABLE CITIES AND COMMUNITIES



13 CLIMATE ACTION



<Introduction>

Nagoya city chosen as an **SDGs Future City** [1]

- Vision 4: "A city with a livable urban environment that exists in harmony with nature"

⇒ Promoting **urban development** toward the realization of a **decarbonized society**

- GOAL: Expanding the introduction of renewable energy and promoting energy conservation [2]

⇒ Indicator: **Installed capacity of solar panels**

Year	Installed capacity [kW]	Increase from previous data
2022	283,620kW	N/A
2023	303,278kW	+19,658kW/yr
2030	(GOAL)490,000kW	+26,675kW/yr

<Target>

Help Nagoya city reach the goal of **490,000kW of solar panel generation facilities** by 2030 with the introduction and distribution of **Microgrids centered around public schools**

<Method>

-Simulate a **microgrid system using solar panels** at Meiwa High School (see right)

-Calculate the following:

- **Costs of solar panels**
- **Electricity generated**
- **CO₂ reduction amount**
- **Period of repayment from electricity savings/sales**



DATA (per 1kW of solar capacity)

Cost of solar panel Installation + maintenance = (a) [3]

Electricity production amount = (b) [4]

CO₂ emission factor = (c) [5]

Alphabet	Year(s) [yr]	Costs [¥]	Electricity production [kWh]	CO ₂ emission factor [kg-CO ₂ /kWh]
(a)	25	410k	-	-
(b)	1	-	1,122	-
(c)	1	-	-	0.411

<Simulation> (alphabet (d) - (i) assigned here)

-Possible installation capacity of solar panels in Meiwa H.S. (calculated from area of rooftops)

⇒ MAX. 4900m²

4900m² ÷ 12.5m² ⇒ 392kw = (d) (1kw ≒ 12.5m²)

- Cost of solar panels (installation + maintenance)

(d) × (a) ⇒ ¥160,720,000

- Electricity generated

(d) × (b) ⇒ 439,824kWh = (e)

- CO₂ reduction amount (TOTAL)

(d) × (b) × (c) ⇒ 180,770kg

-Meiwa H.S. fiscal year 2024 electricity consumption

⇒ 432,172 kWh = (f)

-Surplus electricity generated

(e) - (f) ⇒ 7,652kWh = (g)

- Period of repayment

Money saved from generating electricity = (h)

(f) × ¥20.55/kWh[6] ⇒ ¥8,881,134 = (h)

Money made from electricity sales

(g) × ¥10.98/kWh[7] ⇒ ¥84,019 = (i)

¥160,720,000 ÷ {(h) + (i)} ⇒ 17.9yrs

<Pros and Cons>

⊖ **Set up: expensive**

⊖ **long term investment: ≒ 18 yrs of debt**

⊕ **Profitable after payment period**

⊕ **Benefits of solar fuel: CO₂ emissions reduced**

⊕ **Benefits of microgrid system**

<Future Plans>

Apply this system to **all public schools** in Nagoya

Process:

⇒ Contact Nagoya city officials

⇒ Propose the microgrid system and research

⇒ Nagoya city education boards splits annual

funds to install solar panels

Promote **urban development** toward the realization of a **decarbonized society**

<References>

[1] Planning Division, Planning Department, General Affairs Bureau, City of Nagoya. (2024). *Nagoya City Master Plan 2028*.

[2] City of Nagoya. (2025). *Nagoya City Third Period SDGs Future City Plan*.

[3] Ministry of Land, Infrastructure, Transport and Tourism. (2024). *Ministry of Land, Infrastructure, Transport and Tourism's infrastructure plan for introduction of solar panel generation*.

[4] Handa City Office. (2025). *Installation of solar power generation equipment in public facilities*.

<https://www.city.handa.lg.jp/machi/kankyo/1003013/1010459/1010462.html>

[5] Chubu Electricity MIRAIZU. (2025). *Reporting of CO₂ emissions results for fiscal year 2024 based on the Act on Promotion of Global Warming Countermeasures*. https://miraiz.chuden.co.jp/info/topics/1216516_1939.html

[6] Chubu Electricity's average electricity rate for high voltage

facilities calculated from electricity market data (2023/11~2025/10) New Power Network. (2026). *Changes in electricity unit prices*.

[7] Average purchase price for solar power per kWh/yr for roof-mounted solar panel generating facilities based on FIT system Agency for Natural Resources and Energy. (2025). *FIT/FIP system*.

Oil degradation by common microorganisms

Meiwa senior high school

1. Introduction

- Marine pollution is worsening.
- Possibility of using oil-degrading microorganisms.

2. Background

Previous studies have verified microbial degradation of vegetable oils

3. Hypothesis

Microorganisms found in school soil can degrade oil.

4. Experimental method

1. Add oil to the agar plates.
2. After a period of time, place universal pH paper on the plates and observe whether the pH paper changes color.

Experimental

Agar medium: Agar 5g, Glucose 0.2g, Water 200ml

Soil: Soil obtained on Meiwa senior school grounds

Oil: 100 μ L \times 9 locations



Fig.1 Experiment in progress



Fig.2 Collected soil



Fig.3 Meiwa senior School Map (Numbers indicate soil sampling locations)

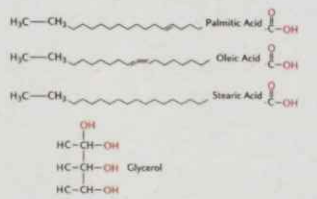


Fig.4 Oil structure diagram

5. Result

No.	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
Day1(pH)	5	5	5	5	5	5	5	5	5	5
Day3(pH)	5	5	5	5	5	5	5	5	5	5
Day20 (pH)	5	5	5	5	5	5	5	5	5	5

Table1: pH level of salad oil

This experiment detected no microorganisms with oil-degrading capabilities the soil within the grounds of Meiwa High School.

6. Discussion

Based on the results of the experiment

-The buffer components contained in agar inhibit the determination of pH. **➔ Add pH indicator to agar medium**

-Emulsify to prevent oil and water from separating when preparing agar medium. **➔ Emulsify the oil.**

-Glucose is easily broken down by microorganisms, so other microorganisms proliferate. **➔ Instead of glucose, add emulsified oil.**

-Instead of taking samples from the soil, obtain samples from places like cafeterias. **➔ Take samples from the cafeteria, not from the soil**

Difficulty in Observing pH Changes Due to Agar's Buffering Effect

The buffering effect of agar makes it difficult to observe pH changes clearly. Even when acids or bases are added, the pH level remains relatively stable, making it hard to notice any significant fluctuations.

Emulsifying Oil and Water Enhances Microbial Breakdown

Glucose vs. Oil: Why is Glucose Easier to Break Down?

Glucose (C₆H₁₂O₆)

Glucose is a simple sugar that is easily utilized by many microbes for energy.

Quick Breakdown
Glucose is quickly metabolized by many microbes.

Oil (Triglycerides)

Oil is a complex lipid that is harder for microbes to break down.

Slow Breakdown
Oil requires special enzymes to be degraded by microbes.

Glucose is easier to break down because it is a simpler, more accessible source of energy for microorganisms.

Microorganisms in oil-rich environments are adapted to thrive in the presence of oil.

They have evolved to break down and utilize hydrocarbons for energy and growth, and have developed special mechanisms to survive in the oily conditions.

Hydrocarbon Utilization Biofilm Formation

Fig.5,6,7,8 Details of the discussion

7. Conclusion

Oil-adapted microorganisms may play a key role in oil degradation, and future research should focus on their effective use for environmental cleanup.

8. Future Plan

- Conduct experiments while incorporating insights gained from previous experiments.
- Following advice from Nanyang Technological University, we will also test oxygen levels BOD and COD.
- Using Friend Microbe technology, we are exploring ways to decompose oil polluting the oceans.
- Business utilizing microorganisms**
- Microorganisms capable of decomposing fats and oils in food products.
- It can eliminate industrial waste derived from oils and fats.

9. Reference

1. Friendmicrobe corporation
<http://friendmicrobe.co.jp>
2. Research on Methods for Isolating and Utilizing Salad Oil-Degrading Microorganisms
https://www.nagasaki-u.ac.jp/zaigaku/ronbun/ronbun0806/seisan0806/seisan_kan0806/seisan_kan158ronbun.pdf

Invasion of Alien Plants through Human Movement

Meiwa Senior High School

Introduction

The spread of alien species affects native species and change the native ecosystems.



Fig.2 Brush mats at ship terminal in Ogasawara Islands [2]

competition genetic introgression



Fig.1 Effects of invasive species[1]

Hypothesis 1

Alien plants are more likely to invade environments with higher traffics.

Method 1

Site A: Side of the road

Site B: An elevated area above the road

30 plants were sampled at both sites A and B [3][4]

Pedestrian traffic
A > B

Sites A and B are
• about 120 meters apart
• exposed to sunlight at noon
• areas of ca. 3m radius



B



A



B

Fig.4 Photographs of the sites

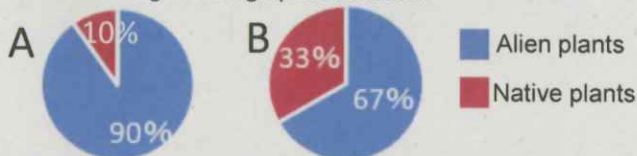


Fig.5 Proportion of alien and native species

	A		B	
	Species	Number of plants	Species	Number of plants
Alien	Lanceleaf tickseed (<i>Coreopsis lanceolata</i>)	15	Cotton rose (<i>Hibiscus mutabilis</i>)	15
	New Easter Lily (<i>Lilium x formosangii</i>)	1	Purpletop vervain (<i>Verbena incampta</i>)	5
	Lantana (<i>Lantana camara</i>)	11		
Native	Bushkiller (<i>Cayratia japonica</i>)	3	Japanese pampas grass (<i>Miscanthus sinensis</i>)	5
			Dayflower (<i>Commelina communis</i>)	1
			Green foxtail (<i>Setaria viridis</i>)	4

Table 1 Species and number of plants

Discussion 1

Including native species, 4 species were found at site A and 5 at site B. →Site B has more diversity of species. There were no common species in both sites. →It is not possible to say human traffic affected these differences.

Hypothesis 2

Alien plants found in heavy pedestrian traffic environments tend to have smaller seeds than others.

Method 2

The seed sizes of 50 alien plants were examined and compared between sites A and B.

Results 2

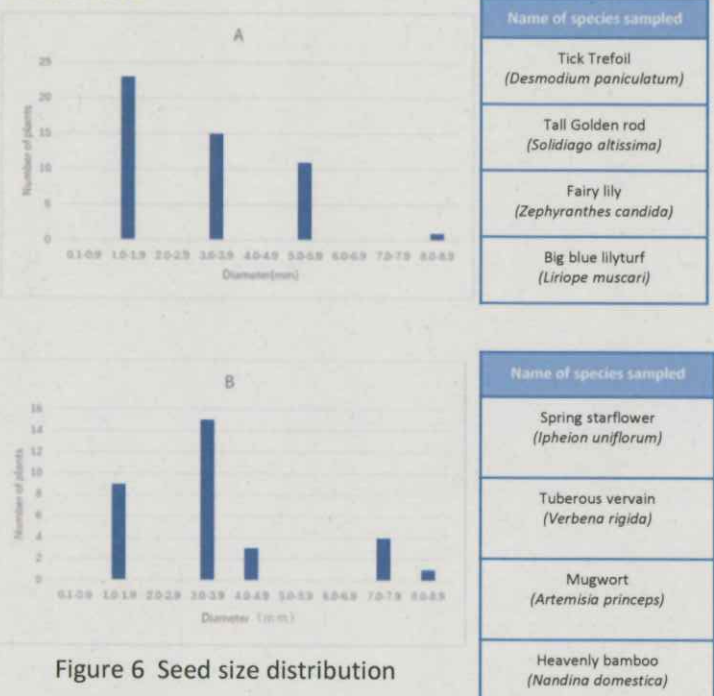


Figure 6 Seed size distribution

Discussion 2

- Plants with seed sizes between 1mm and 2mm were more frequently found at site A.
→They are easy to be brought by human. Alien species have an advantage for living in high-traffic areas.
- Fairy lily mainly reproduce by bulbs.
→They are not closely related with seed size.

Conclusion

Small-seeded alien plants that reproduce by seeds may be more likely to become invasive than other plants.

Future plan

To study about how to prevent the invasion of alien plants.
To study the diversity of seed shapes.

References

- [1]Ministry of the Environment. Invasive Alien species <https://www.env.go.jp/nature/intro/2outline/invasive.html>
- [2]Ogasawara World Heritage Centre. Measures against non-native species <https://ogasawara-info.jp/english/visit/about-alien/>
- [3]Taki Yasuhiko(2008).Alien species in Japan. Heibonsha
- [4]Mori Akihiko(2020).A Guide to Identifying 950 Naturalized and Alien Plants.



FAIRTRADE INTERNATIONAL

Effective Methods for Selling Fair Trade Products

Meiwa Senior High School

Introduction

< Fair Trade >

A system that supports producers in developing countries by paying fair prices.

< Background >

- Women farmers in Côte d'Ivoire
Participation in fair trade led to improvements in their living conditions. *1
- Awareness of the term "fair trade"
Overall awareness: **53.8%**
Among people in their late teens: **78.4%** *2

Purpose

- Increase awareness of fair trade
- Find more effective ways to sell fair trade products
- Related to SDGs 10: Reduced Inequalities

Hypothesis

- Awareness of fair trade among teenagers is high but... **High price** and **Hard to find**

⇒ make people less likely to be purchased

Research Method

- ① Questionnaire survey in my class
- ② Observation of stores selling fair trade products

Result

- ① Survey (22 students @Meiwa High)

Q. Have you ever purchased a fair trade product?



Q. Why did you purchase it?

- To support producers
- Worth more than the price

Q. Why did you not purchasing it?

- More expensive than regular products
- Did not find it particularly attractive

- ② Results of store observation

- Same chocolate amount
Regular: **298yen = 2.45\$**
Fair Trade: **598yen = 4.85\$**

→ About 2 times more expensive

Discussion

- Knowledge does not always lead to action
- People who understand fair trade in-depth are more likely to buy

Proposal

Current challenges	Improved sales methods
High-price	· Reduce the number of intermediaries
Hard to find	· Put it in the center of shelves · design eye-catching packaging
Limited distribution	· Increase availability in convenience stores and supermarkets
Have Limited knowledge about fairtrade	· Set the information sheet near the products · Education at school

*3

Future Plans

- Improve sales methods of fair trade products
- Use SNS to spread information and raise awareness

Summary

The most effective way to sell fair trade products is...

→ Place...center of shelves

at supermarket or convenience store

Package...eye-catching design

Price...Cut out intermediaries to lower prices

Reference

*1 Fairtrade International (2025) 「The Story of Cocoa Farmers in Côte d'Ivoire」

<https://www.fairtrade.net/jp-jp/why-fairtrade/impact/impact-stories-/impact-story-from-cote-d-ivoire.html>

*2 Fairtrade Forum Japan (2019)

<https://fairtrade-forum-japan.org/wp-content/uploads/2021/03/96ac6962b8814c9bc75f2ba40927fe00.pdf>

*3 「Why is the UK fair trade economy so strong compared to Japan??」 (2024)

<https://ethicalconnections.jp/blogs/news/why-is-the-uks-fair-trade-economy-so-strong-compared-to-japan>

Temperature and Sound of Cicadas

Meiwa Senior High School



1. Introduction

The volume of cicada sings varied during the day.

➔The relationship between weather conditions and cicada singings volume was investigated.

2. Hypothesis

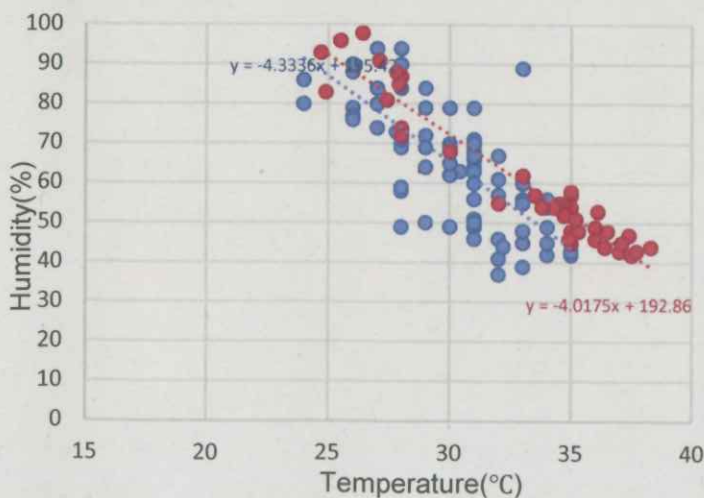
- ① Cicadas stop singing at high temperature.
- ② Changes in humidity do not affect cicadas singing.

3. Method

- Target species: Outdoor cicada populations
- Period: July 18 to August 17, 2025
- Measurement location: Inuyama City
- Measurement tools : Smartphone apps
(Thermometer++, Noise Meter)
Japan Meteorological Agency website
- Date: Temperature, humidity, and sound intensity every three hours from 9:00 AM to 6:00 PM



4. Results ^{[1],[2]}



- Cicadas were singing Correlation R= -0.7339
- Cicadas were not singing Correlation R=-0.9594

Fig.1 The relationship between temperature and humidity on singing and non-singing days

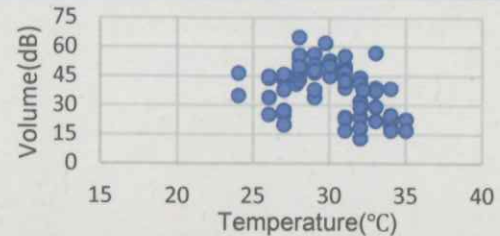


Fig.2 The relationship between temperature and volume of cicada is singing on days (when they were singing)

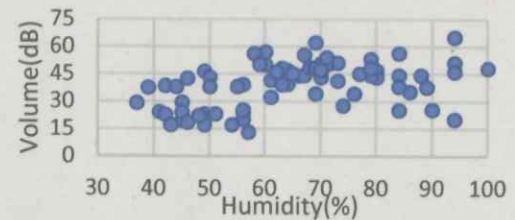


Fig.3 The relationship between humidity and volume of cicada is singing on days (when they were singing)

- Cicadas sing within a temperature range of 24°C to 35°C.
- They often do not sing at temperatures above 35°C.

5. Discussion

- As hypothesized ①, cicadas do not sing at temperatures above 35°C
Reason: Preventing body temperature rise.
- As hypothesized ②, changes in humidity do not affect whether cicadas sing or not
➔Temperature has greater influence than humidity.
The volume of cicadas' singing changes with fluctuations in humidity. (fig.3)
- Based on Fig.2, optimal temperature 30°C

6. Summary

- Singing range : 24°C-35°C
- Above 35°C : Stop singing
- Most active temperature : Around 30°C
- Humidity : Affect volume

7. Future Plans

- Expand the observation area, compare with other regions, and identify factors affecting changes in cicada singings volume.
- Conduct species-specific surveys.

8. References

- [1] Cicada and Stink Bug Species | Insect Guide
<https://konchu-zukan.info/semi.php>
- [2] Japan Meteorological Agency | Historical Weather Data Search
https://www.data.jma.go.jp/stats/etrn/view/annually_s.php?pr ec_no=51&block_no=47636&year=&month=&day=&view=a2

Water Pollution And Creatures Living in the River

Meiwa Senior High School

1. Introduction

Creatures living in Fushino River were done research. Many creatures indicate water quality.

Table 1. [1]

Water class	Water appearance	Indicator creatures
class 1	clean	crabs, stoneflies, etc.
class 2	slightly dirty	striped shrimp, clams, etc.
class 3	dirty	water bugs, snails, etc.
class 4	very dirty	burrowing snails, etc.

2. Hypothesis

Clean riverbed creatures are observable at Fushino River, and the creatures living there prefer clean water.

3. Method

1. Aquatic creatures were collected using a net
2. Morphology of each creatures searched in the web



4. Result

The creatures are observed in Fushino River.

Table 2.

Creature	Number
kawabatomoroko	11
striped shrimp	6
burrowing snail	2
cotton frog	2
Water strider	4



kawabatomoroko



water strider



cotton frog



striped shrimp



burrowing snail

<Suitable water quality>

The water pollution two creatures prefer is caused by nutrients.

- Striped shrimp likes plankton
- Burrowing snail likes sludge

Table 3.

Creature	Water appearance
kawabatomoroko	clean to somewhat clean
cotton frog	wide range
water strider	clean

Table 4. [2]

Water quality	Dissolved oxygen(mg/L)
clean	≥ 7.0
slightly dirty	≥ 5.0
dirty	≥ 3.0
very dirty	< 3.0

<Water quality and dissolved oxygen>

• The amount of oxygen dissolved in water indicates water pollution.

◎Clean water

Less organic matter in the water→Less oxygen available for microorganisms to decompose

⇒The amount of oxygen in the water increases

◎Dirty water

A lot of organic matter in the water→More oxygen for microorganisms to use in decomposition

⇒The amount of oxygen in the water decreases

5. Discussion

• Kawabatomoroko and water striders lived in clean water, but striped shrimp and burrowing snails lived in slightly or very dirty water

⇒They can survive even if the water quality isn't their preferred

• Creatures that prefer dirty water can live in clean water

⇒The two species adapted to polluted water can stick their heads out of the water when oxygen is low, as they perform lung respiration and there are sufficient nutrients in the river

6. Conclusion

Unlike my hypothesis, creatures that prefer dirty water can survive in clean water if the conditions of oxygen and nutrients are right.

7. Future plans

Fushino River is beautiful and it is essential to keep this river clean.

⇒The environmental protection organization engaged in a variety of activities

<What I can do>

- Participate in local cleanup activities
- Choose environmentally friendly detergents
- Avoid pouring used oil down the drain

8. References

[1] Indicator creatures and water quality levels for "Simple water Quality Survey of Aquatic creatures" grade

<https://www.env.go.jp/press/files/jp/1303.html>

[2] Regarding future indicators for river water quality management
000046619.pdf

[3] Learn about environmental measurements

<https://www.city.kasugai.lg.jp/kurashi/gomi/keihatsu/1021698/1032678.html>

Relationship between Hit Songs and Society

Meiwa Senior High School

1. Introduction

- Investigate whether hit songs are related to Japanese social events, focusing on their lyrics.
- Investigate the difference by years.

2. Background

Previous study...analyze hit songs' tempo and key
 In economic boom→fast paced
 include # sign } Popular
 In recession→include ♭ sign

3. Hypothesis

These days, people can listen to music anytime anywhere by streaming services.
 →**Recent hit songs lyrics are more influenced by social situations than old hit songs.**

4. Method

- ① List the years when there were big social events in Japan by ChatGPT.
- ② Find words which have emotional image or meanings in the lyrics of hit songs in the years by using "User Local AI text mining".
 *The top 10 best selling single on the Oricon single chart (in 2020, the top 10 songs on streaming playbacks)
- ③ Classify the words into positive or negative.
 (e.g., **Positive**...happy, smile, good
Negative...sadness, tears, dead)

5. Result

Table 1. The years and social events ChatGPT listed

1970	Osaka Expo, Four big pollution diseases
1989	Peak of the bubble economy, The end of the Cold War
1991	The collapse of the bubble economy
2008	Financial Crisis
2011	The Great East Japan Earthquake
2020	COVID-19 pandemic

* Bubble economy...asset prices rose abnormally

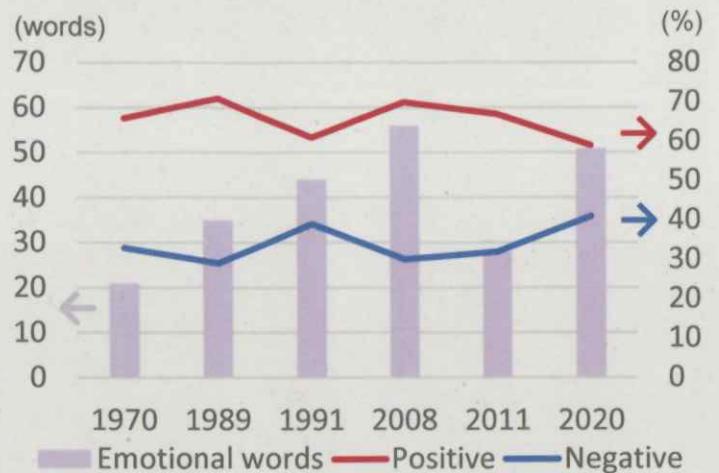


Fig 1. The number and proportion of emotional words

6. Discussion

- 1970... Few words→Not be influenced by society
- 1989... Positive words' proportion was high
 →Bright feelings for economic boom and peace
- 1991... Negative words' proportion was high
 →Sadness for the recession
- 2008... Many words
 Positive words' proportion was high
 →Desire to get over Financial Crisis
- 2011... Few words
 Positive words' proportion was high
 →Hope for support for earthquake
- 2020... Negative words' proportion was high
 →Fear of facing COVID-19 pandemic



- **Both old songs and recent songs are related to the society.**
 In the past, listening to music on TV or radio were main entertainment.
- **The number of emotional words tend to increase in the decline.**
 People might often listen to music when they're feeling down.

7. Future Plans

- To increase the amount of data to conclude more conclusively.
- To research the relationship which focus on economy.

8. Reference

Hobara Nobuhiro (2009) "Do hit songs tell(sing) the story of the economy?"

Global Warming as Seen Through Rice Yields

Meiwa Senior High School

1 Introduction

The earth today:

- the change in crop yields by global warming



The purpose of my research:

- revealing the regional characteristics of changes in crop yields



2 Background

Temperature rising by global warming[1]:

- not uniform
- larger in high-latitude regions
- larger in summer

⇒ temperature rising has differences in regions
⇒ changes in crop yields may be the same

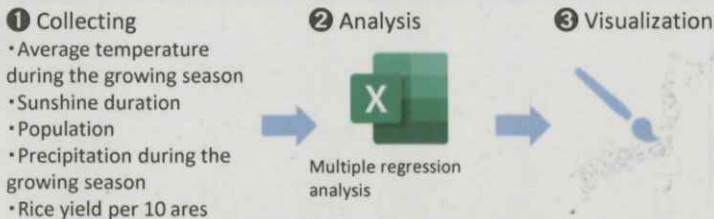


3 Hypothesis

The impact of rising temperatures on rice yields is not uniform across Japan, and colder regions experience larger positive effects.

4 Method

- 1 Collecting data** Collect data for each prefecture over the past 50 years (1974–2023).[2-4]
- 2 Multiple regression analysis** Analyze the data collected in Step 1 using multiple regression analysis.
- 3 Visualization by mapping** Visualize the results of Step 2 by coloring the map of Japan.



7 Future Plan

The results of this research:

- Visualization of the regional differences of rice yields in Japan
- Greater yield increases in higher-latitude and higher-altitude regions

Future directions:

- Include altitude in multiple regression analysis
- ⇒ Examination of the effect of elevation on rice yields

9 Acknowledgments

I would like to express my sincere gratitude to Professor Kazuhiko Kakamu of Nagoya City University for his dedicated guidance throughout this research.

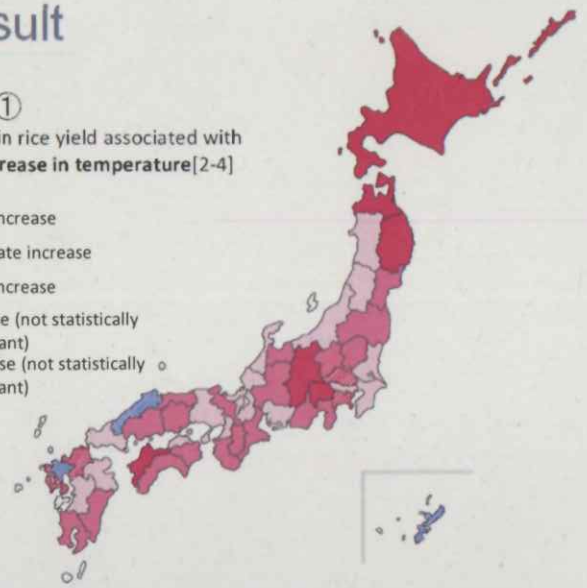
I am also deeply grateful to Anna Kuwayama, an alumna of our university, for her warm and continuous advice.

5 Result

Figure ①

Changes in rice yield associated with a 1 °C increase in temperature[2-4]

- Large increase
- Moderate increase
- Small increase
- ▨ Increase (not statistically significant)
- ▨ Decrease (not statistically significant)



region	Temperature coefficients	Statistical significance
Northern Japan	+ · large	Significant
Western Japan	+ · small - · small	Significant (occasionally not significant)
Nagano and Yamanashi(Central Japan)	+ · large	Significant

The findings indicate possible regional differences in the impact of temperature increase on rice yields.

6 Discussion

3 major point of this study:

- ① the large increase in rice yields in northern Japan
- ② the small increase or decrease in rice yields in western Japan
- ③ the large increase in rice yields in central Japan

Discussion:

- ① ⇒ Association with high latitude
- ② ⇒ Association with middle and low latitude
- ③ ⇒ Association with high altitude

- the large increase in high latitude and latitude regions
⇒ Colder regions can turn into environments suitable for rice cultivation.
- the small increase or decrease in middle and low latitude regions
⇒ Warmer regions can turn into environments suitable for rice cultivation.

8 Reference

- [1] Japan Meteorological Agency. Climate Change in Japan 2025. jma.go.jp (2025.12.10)
- [2] Japan Meteorological Agency. Historical Weather Data Search. jma.go.jp
- [3] Ministry of Agriculture, Forestry and Fisheries. Crop Situation Survey. maff.go.jp
- [4] Statistics Bureau of Japan. Population Estimates (2019). e-stat.go.jp



Improving the Efficiency Of Learning Support

Meiwa Senior High School

1.Objective

Let students to ask more questions and stay motivated to learn.

2.Introduction

- supporting mainly to elementary and junior high school students in learning support.
- Few students ask questions.

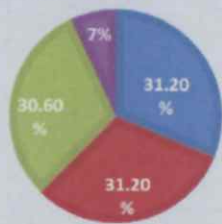
When students asked questions , they gained more learning outcomes and confidence.([1,2])

→Asking questions is effective to study



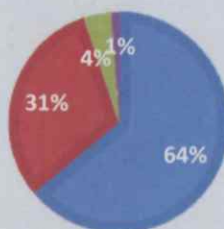
Graph1:

You feel embarrassed to ask questions about what they learn



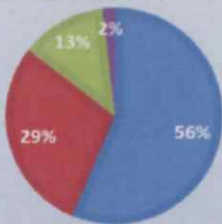
Graph:2

Teachers kindly answer questions



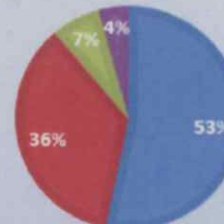
Graph3:

When you have a question about what they learn and teachers are available, you want to ask it right away.



Graph4:

It's difficult to go and ask unfamiliar people questions about what they learn



From graph 1 to 4, it can be assumed that speaking up teachers affects the number of questions asked.



In this study, the influence of speaking up teachers to ask questions investigated.

4.Hypothesis

The number of questions increases in an environment where students can speak up teachers without having to go and ask.

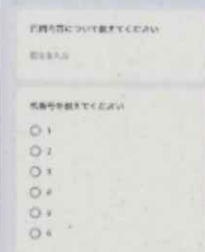
10.References

- [1]The efforts of an online student question-generation strategy on elementary school student English learning. <https://www.researchgate.net>
- [2]The impact of question-making on proactive, interactive, and deep learning. KobeUniversity. <https://da.lib.kobe-u.ac.jp>

5.Method

- Students call teachers (Conventional)
- Teachers go around talking to children (Strategy A)
- Students speak up teachers by using a Google Form when they have a question (Strategy B)
- Set a private question-answering place (Strategy C)

Compare the Conventional with Strategy A to C.



←Google Forms to use

- questions to ask (free description)
- desk number (number selection)

6.results

types	conventional	A	B	C
amount	2	5	-	2

(about 10 people, ages 9-15, each measurement)

- Strategy B could not be conducted.
- Strategy A had 2.5 times the number of questions than Conventional.
- Strategy C had the same number of questions as Conventional.

7.Discussion

- Strategy A is currently effective than others.
 - a lower psychological hurdle to be asked directly.
- The same person asked several questions.
 - need to conduct under fixed conditions.
- Whether they were concentrating or had hesitated to go answering place during Strategy C
 - Judging by post-event surveys and students' behavior

8.Conclusion

My hypothesis may be right, but it is impossible to conclude. The work of both students and teachers may be important.

9.Future Plans

- Increase the credibility of the results
 - 1.keep members the same
 - 2.keep the number of people the same
 - 3.increase the number of attempts
- Consider whether it can be used elsewhere.



Evaluation of Hair Damage by Surface Charge

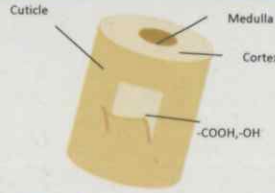


Meiwa Senior High School

Introduction

- Cuticle damage exposes highly hydrophilic functional groups¹
- In water, changes in the hair surface charge correlate with hair damage²

Untreated hair ("normal hair"), bleached hair ("bleached hair")

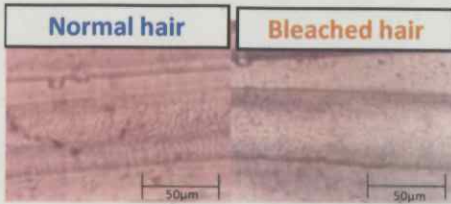


Hypothesis

- Electrical response of hair can serve as an indicator for evaluating hair damage.

Experiment 1 Observation of Cuticle

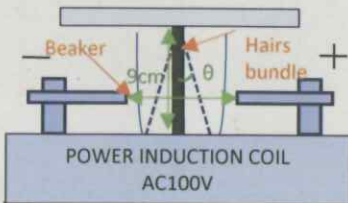
- Preparation of hair mold (laundry starch)
- Microscopic observation



- Normal hair : clear cuticle structure
- Bleached hair : not clear cuticle structure
- Disruption of cuticle structure defined as hair damage

Experiment 2 Hair Angle and Discharge voltage

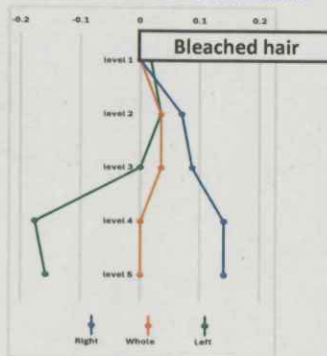
- Hair bundle placed in electric field (induction coil)
- Measurement of hair deflection angle
- Discharge voltage: level 1-5
- Humidity: 45%
- Using the same hair before and after bleaching
- Conducted the experiment six times



$$q = \frac{Mg}{E} \tan \theta$$

- q: total charge
- M: weight of hair bundle
- E: electric field strength
- θ : angle in electric field

This equation was derived from the balance between the electric force (qE) and the gravitational force ($Mg_{(land)}$)



Result 2

Normal hair	Left[*]	Whole[*]	Right[*]
level 1	0	0	0
level 2	0	0	0
level 3	0	0	0
level 4	0	0	0
level 5	0	0	0

Bleached hair	Left[*]	Whole[*]	Right[*]
level 1	1	0	0
level 2	-2	2	4
level 3	0	2	5
level 4	-10	0	8
level 5	-9	0	8

Discussion 2

- Change in angle observed only in bleached hair at the same voltage
- Bleached hair may be more responsive to electric fields

How Bleached Hair Moves

$$q = \frac{Mg}{E} \tan \theta$$



When M and g are same numbers, increasing θ is increasing E

Weak dependence on the $(mg/E)\tan\theta$ was observed experimentally



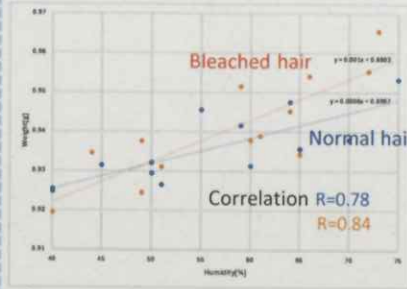
It is suggested that factors not included in the formula are having an effect

- Electrostatic polarization of water
- Hair softness

Experiment 3 Humidity and Hair Moisture

<3.1 Humidity and Hair Moisture >

- Bundle of about 700 hairs
- Weight measured 13 times at each humidity level
- Humidity: 40-75%
- Higher humidity → higher moisture content
- Steeper slope for bleached hair
- High moisture absorption in bleached hair



<3.1 Hair Angle, depending on humidity >

- Hair bundle placed in electric field (induction coil)
- Measurement of hair deflection angle
- Humidity: 35%, 55%, 75%
- Conducted the experiment six times

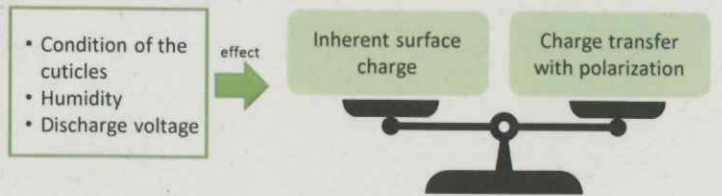
Normal hair	Left[*]	Whole[*]	Right[*]	Bleached hair	Left[*]	Whole[*]	Right[*]
35%	0	0	0	35%	-1	1	4
55%	0	0	0	55%	-5	0	5
75%	-3	1	6	75%	-7	0	7

Toward positive side: positive angles, Toward negative side: negative angles

Discussion 3

- Positive correlation between angle and humidity
- Increased moisture content may contribute to larger angle

Proposed Mechanism	Normal hair →Surface water on hair is small	Bleached hair →Surface water on hair is large
Low humidity→ Water's Electrostatic Polarization is small	Low response	The inherent surface charge may tend to prevail
High humidity→ Water's Electrostatic Polarization is large	The inherent surface charge may be emphasized	High response



Conclusion

- ◇ In this study, we focused on the electrical response of hair rather than its surface charge.
- ◇ The size of the hair's electrical response was influenced by its moisture content.
- ◇ The size of the hair's electrical response may serve as an indicator for evaluating hair damage.

Future plans

- Check the effect of hair softness.
- Compare the hair movement in an electric field with and without hair care products.

References

1. Shigeto INOUE(2011) "Structures and Properties of Hair Surface"
2. Yuki NAKANO(2022) "Quantification of Bleached Hair Damage by Streaming Potential Method and Tracking of Adsorption of Cationic Cellulose"