

様式 A-1  
(FY2024)

2024 年 2 月 5 日

## サイエンス・ダイアログ 実施報告書

1. 学校名・実施責任者氏名: 岐阜県立恵那高等学校・夏目佳代子
2. 講師氏名: Dr. Raj Kishan AGRAHARI
3. 講義補助者氏名: \_\_\_\_\_
4. 実施日時: 2024年 2月 5日 (水) 13:45 ~ 15:25
5. 参加生徒: 1 年生 31 人、 2 年生 12 人、 3 年生 0 人 (合計 43 人)  
備考: (例: 理数科の生徒) 理数科の生徒
6. 講義題目: Under Stress: Understanding Acidic Soil Challenges and Nitrogen Nutrition
7. 講義概要: インドの気候や土壌の説明と農業を研究しようと思った理由。また同じ分野で活躍する、他の研究者が育てている研究段階の作物の紹介と、作物に必要な栄養素や肥沃な土壌づくりに関する研究。
8. 講義形式:  
☒ 対面 ・ ☐ オンライン (どちらか選択ください。)
  - 1) 講義時間 40 分 質疑応答時間 5 分
  - 2) 講義方法 (例: プロジェクター使用による講義、実験・実習の有無など)  
対面による講義
  - 3) 事前学習  
☒ 有 ・ ☐ 無 (どちらかに○をしてください。)  
使用教材 講師から事前にいただいたアブストラクト
9. その他特筆すべき事項:

講師からの講義に加え、本校生徒が自分たちの課題研究(物理、化学、生物、または数学)に関する発表を英語で行い、講師から質疑応答やアドバイスを受けた。

**Form B-2**  
**(FY2024)**  
**Must be typed**

Date (日付)  
10/02/2025 (Date/Month/Year: 日/月/年)

**Activity Report -Science Dialogue Program-**  
(サイエンス・ダイアログ 実施報告書)

- Fellow's name (講師氏名): RAJ KISHAN AGRAHARI (ID No. P24104 )
- Name and title of the lecture assistant (講義補助者の職・氏名)  
Kayoko Natsume (Science teacher at Gifu Prefectural Ena High School)
- Participating school (学校名): Gifu Prefectural Ena High School
- Date (実施日時): 05/02/2025 (Date/Month/Year: 日/月/年)
- Lecture title (講義題目):  
Plants Under Stress: Understanding Acidic Soil Challenges and Nitrogen Nutrition
- Lecture format (講義形式):
  - ◆ ☒ Onsite ・ ☐ Online (Please choose one.)(対面 ・ オンライン)((どちらか選択ください。))
  - ◆ Lecture time (講義時間) 30 min (分), Q&A time (質疑応答時間) 15 min (分)
  - ◆ Lecture style (ex.: used projector, conducted experiments)  
(講義方法 (例: プロジェクター使用による講義、実験・実習の有無など))  
Used Projector
- Lecture summary (講義概要): Please summarize your lecture within 200-500 words.

Lecture Summary: Plants Under Stress – Understanding Acidic Soil Challenges and Nitrogen Nutrition

On my visit to Gifu Prefectural Ena High School for the JSPS Science Dialogue on 5/02/2025, I presented a lecture on the essential role of nutrients in plant growth, the challenges posed by acidic soils, and the importance of sustainable nitrogen nutrition.

Plants require essential nutrients for growth and development, as deficiencies can limit their productivity and impact the food chain, affecting animals and humans alike. The concept of mineral nutrition was pioneered by Justus von Liebig, whose work led to the development of fertilizers. Later, in 1939, Arnon and Stout identified 17 essential elements necessary for plant growth, which are categorized into non-mineral elements (C, H, O) and mineral nutrients (e.g., N, P, K, Ca). These nutrients are further classified based

on their function, plant requirements (macronutrients vs. micronutrients), and mobility within the plant.

Fertilizers, particularly nitrogen-based ones, play a crucial role in enhancing crop yields. However, their excessive or improper use can contribute to environmental pollution, such as water contamination and greenhouse gas emissions. To mitigate these issues, modern agricultural innovations like optimized fertilizer application techniques are being developed. These approaches aim to maximize efficiency while minimizing environmental impact.

Soil acidification is another major challenge in agriculture. Factors such as prolonged fertilizer use, high rainfall, and crop growth contribute to decreasing soil pH. Acidic soils limit nutrient availability, hinder root growth, and negatively affect overall plant health. Addressing these issues requires sustainable soil management strategies, including proper fertilization techniques, liming practices, and the development of acid-tolerant crop varieties.

In addition to discussing plant nutrition and soil stress, I also shared my personal journey—why I chose to become a researcher and what brought me to Japan.

During the interactive session, students raised insightful questions, such as why soil acidity affects plant growth and how genetically modified crops are developed. These discussions highlighted the importance of scientific research in developing sustainable solutions for global agricultural challenges.

This session aimed to inspire students to explore plant science and environmental sustainability, emphasizing the crucial role of research in addressing real-world problems.

◆Other noteworthy information（その他特筆すべき事項）:

- Impressions and comments from the lecture assistant（講義補助者の方から、本プログラムに対する意見・感想等がありましたら、お願いいたします。）:



