RP Demonstration Farm 17AUG25

Figure 1: RP Demo Farm Map from EOSDA Crop Monitoring

1 OVERVIEW OF FARM

1.1 Executive Summary

The RP demo farm's corn crop is in a healthy early developmental stage (BBCH 70-81). NDVI values indicate a significant increase, suggesting good vegetative health. Weather forecasts indicate a mix of rain and mild temperatures, necessitating careful water management.

Field Name: RP demo farm
Field coordinates: (11.20211414511615, 9.994276903567439)
Field size: 0.14 ha
Last sowing crop name: Corn (Maize)
Sowing date: 2025-06-11

1.2 Crop & Field Status

Recent NDVI readings show an upward trend, with a peak average of 0.490 in late July, signifying robust biomass development. Following this, a decline to 0.116 on July 19 may indicate stress or adverse conditions. The current crop is in the fruit development stage, demonstrating good growth consistency.

1.3 Weather Review & Short-Term Forecast Risks

Weather conditions over the past month have provided adequate moisture, with rainfall peaking at 14.3 mm on July 22. However, forecasts predict light to moderate rain and moderate humidity in the coming week, which can lead to crop stress if improperly managed. Strong winds and overcast conditions will also prevail.

1.4 Actionable Recommendations

Given the current harvesting date is not detected, irrigation should be carefully managed to avoid waterlogging during expected rains. Regular scouting for pests and diseases is essential to maintain crop health and yield. Timing for nitrogen fertilization should be considered, based on the crop's nutrient uptake patterns.

1.5 Data Quality Notes & Assumptions

All gathered data is derived from reliable satellite and meteorological sources. However, some NDVI measurements may have slight variances due to atmospheric conditions, potentially affecting interpretations. Continuous monitoring is recommended to adjust strategies as necessary.

2 DISEASE AND PEST PREDICTIONS

Figure 2: Disease and Pest Prediction of RP Demo Farm from EOSDA Crop Monitoring

2.1 Corn (Maize) Leaf Blight[1]

Northern Corn Leaf Blight (NCLB) is a significant foliar disease of maize, caused by the fungus Exserohilum turcicum. It's characterized by long, elliptical, gray-green or tan lesions on the leaves. The disease can cause yield losses of 15 to over 60% worldwide, especially in tropical and subtropical regions.

Symptoms:

- **Lesions:**

The most prominent symptom is the appearance of long, canoe-shaped lesions on the leaves. These lesions are initially gray-green, then turn tan, and may develop dark areas of fungal sporulation.

- **Leaf Blight:**

Severe infections can lead to extensive blighting of leaves, impacting the plant's ability to photosynthesize.

- **Timing:**

[1] Source: AI generated
https://www.google.com/search?q=2.1+Corn+(Maize)+Leaf+Blight&rlz=1C1GGRV_en&oq=2.1%09Corn+(Maize)+Leaf+Blight+&gs_lcrp=EgZjaHJvbWUyBggAEEUYOTIHCAEQIRiPAjIHCAIQIRiPAtIBCTQ0OTBqMGoxNagCCLACAfEFg6LpY3pIzBPxBYOi6WN6SMwT&sourceid=chrome&ie=UTF-8

Symptoms usually appear after the silking stage, but earlier infections can lead to more severe disease.

Figure 3: Corn Leaf Blight from https://extension.umn.edu/corn-pest-management/northern-corn-leaf-blight

Causal Agent:

- The fungus Exserohilum turcicum (formerly Helminthosporium turcicum) is the pathogen responsible for NCLB.
- This fungus overwinters on corn residue and can produce different races that interact differently with maize hybrids.

Conditions Favoring Disease:

- **Moderate Temperatures:** NCLB thrives in temperatures between 64 and 80 degrees Fahrenheit.
- **Moisture:** Prolonged periods of moisture, such as heavy dews or frequent rainfall, promote disease development.

Management Strategies:

- **Resistant Hybrids:**

Planting maize varieties with genetic resistance to NCLB is a key management strategy.

- **Crop Rotation:**

Rotating crops with non-host plants can help reduce the pathogen inoculum in the field.

Figure 4: Northern Corn Leaf Blight from https://en.wikipedia.org/wiki/Northern_corn_leaf_blight

- **Fungicides:**

In some cases, particularly for seed production, foliar fungicides may be necessary to manage the disease.

- **Cultural Practices:**

Other practices like optimizing plant density and improving air circulation can also help reduce disease severity.

2.2 Leaf Blight[2]

Leaf blight in corn is a common disease caused by various fungal pathogens. Northern corn leaf blight (NCLB) and Southern corn leaf blight (SCLB) are the two most significant types affecting corn crops. NCLB, caused by Exserohilum turcicum, is characterized by large, cigar-shaped lesions on leaves, while SCLB, caused by Cochliobolus heterostrophus, produces smaller, more numerous lesions. Both diseases can lead to significant yield losses due to reduced photosynthesis and premature leaf death.

Northern Corn Leaf Blight (NCLB):

- **Causative Agent:**

Exserohilum turcicum (anamorph of Setosphaeria turcica)

- **Symptoms:**

Large, elongated, gray-green or tan lesions, often with dusty-looking fungal spores in the center.

- **Favorable Conditions:**

Cool to moderate temperatures (66-80°F or 18-27°C), high humidity, and prolonged leaf wetness.

- **Impact:**

Reduced photosynthesis, ear fill, and yield losses, especially when occurring early in the season.

Figure 5: Leaf Blight of Corn (Source https://www.garden.eco/southern-corn-leaf-blight)

- **Management:**
    - **Resistant Hybrids:** Selecting corn varieties with genetic resistance is crucial.
    - **Crop Rotation:** Rotating crops can help reduce the amount of fungal inoculum in the field.

[2] Source: AI generated https://www.google.com/search?sca_esv=638a8857656ffa19&rlz=1C1GGRV_en&sxsrf=AE3TifN8b5T658BPW4UfFno1ViXR6t0i6A:1755455297755&q=leaf+blight+of+corn&source=lnms&fbs=AIIjpHxU7SXXniUZfeShr2fp4giZ1Y6MJ25_tmWITc7uy4KIegmO5mMVANqcM7XWkBOa06dn2D9OWgTLQfUrJnETgD74R4wfK5HnXhGEj7DL013zMKthb18dEOPKnexSPoLk4e15swunyD5-HTAhm7TBeTu7TsMHKSWaBFXbCgMljQTQs76sArFJULImzKXrvVNkj4FAVIWbwDTmB635s1yxD8ryelDdKQ&sa=X&ved=2ahUKEwitj8TLvJKPAxWhSEEAHYT_Bw8Q0pQJegQIDxAB&biw=1280&bih=559&dpr=1.5

- **Tillage:** Proper tillage can help break down corn residue where the fungus overwinters.
- **Fungicides:** Application of fungicides can be effective in managing NCLB, especially when combined with other methods.

Southern Corn Leaf Blight (SCLB):

- **Causative Agent:** Cochliobolus heterostrophus
- **Symptoms:** Smaller, numerous, and more oval-shaped lesions, which can coalesce and cause leaf blight.
- **Favorable Conditions:** Warm, humid weather with frequent rains.
- **Impact:** Yield losses can be substantial, especially when the disease progresses rapidly.
- **Management:** While not as prevalent as NCLB currently, managing SCLB involves similar strategies to NCLB, including resistant varieties, crop rotation, and potentially fungicides, according to educational resources.

2.3 Western Corn Rootworm[3]

The Western Corn Rootworm (WCR), Diabrotica virgifera virgifera, is a significant pest of maize, and while there's no specific mention of its presence in Nigeria within the search results, its potential impact and management strategies are relevant. The larvae of WCR cause the most damage by feeding on the roots, weakening the plant and reducing nutrient and water uptake, leading to yield losses. Adult beetles also feed on various parts of the maize plant, including pollen, silk, and kernels, further impacting yield and grain development.

Impact and Management:

- **Larval Damage:**

WCR larvae primarily damage maize by feeding on the roots, leading to lodging (plants falling over) and reduced nutrient and water uptake.

[3] Source: AI generated
https://www.google.com/search?q=Western+Corn+%28Maize%29+Rootworm+nigeria&sca_esv=638a8857656ffa19&rlz=1C1GGRV_en&biw=1280&bih=559&sxsrf=AE3TifP6-ZdMqNTdnnvrqzTzh7DJ6It8rQ%3A1755450799864&ei=rw2iaM66NP6thbIPmtmQgQc&ved=0ahUKEwiOzuLqq5KPAxX-VkEAHZosJHAQ4dUDCBA&uact=5&oq=Western+Corn+%28Maize%29+Rootworm+nigeria&gs_lp=Egxnd3Mtd2l6LXNlcnAiJVdlc3Rlcm4gQ29ybiAoTWFpemUpIFJvb3R3b3JtIG5pZ2VyaWEyBRAhGKABMgUQIRigATIFECEYoAEyBRAhGKABSMU6UKQNWKwicAF4AZABAJgBywegAe8jqgEJMy0xLjEuNS4xuAEDyAEA-AEBmAIHoALEG8ICChAAGLADGNYEGEfCAgUQIRifBcICBRAAGO8FwgIIEAAYgAQYogTCAgQQIRgVmAMAiAYBkAYIkgcLMS4zLTEuMy4xLjGgB_cPsgcJMy0xLjMuMS4xuAe9G8IHBTIuNC4xyAcM&sclient=gws-wiz-serp

- **Adult Damage:**

Adult beetles feed on various parts of the plant, including pollen, silk, and developing kernels, causing further yield losses.

Figure 6: Adult Western Root Worm (Source https://russellipm.com/insect/diabrotica-virgifera-western-corn-rootworm/)

- **Management Strategies:**

Integrated Pest Management (IPM) approaches are crucial for managing WCR. This includes:

- **Crop Rotation:** Rotating maize with other crops can disrupt the WCR life cycle and reduce population densities.
- **Transgenic Maize:** Bt maize expressing insecticidal toxins (like Cry proteins) can provide control, but resistance development is a concern.
- **Nematodes:** Soil-dwelling nematodes can be used as a biological control agent, as they are natural predators of corn rootworm larvae.
- **Insecticides:** Chemical insecticides can be used, but resistance can develop.
- **Attractants and Repellents:** Research is ongoing to use attractants to lure WCR into traps or to combine them with pesticides for targeted control.

Figure 7: Corn roots damaged by Western Rootworm (Source https://blogs.k-state.edu/kansasbugs/2018/06/15/corn-rootworms-3/)

- **Plant Resistance:** Developing maize varieties with increased resistance to WCR is an important long-term strategy.

- **Farmer Field Schools:** These schools provide training and practical experience in managing WCR and other pests.

Potential for Nigeria:

While the Western Corn Rootworm is not explicitly mentioned in the search results as being present in Nigeria, its potential impact on maize production in the region is significant given its established presence in other parts of the world, including Europe. Given that Nigeria is a major maize producer, understanding the pest's biology and implementing effective management strategies are crucial for maintaining and improving yields.

Key Considerations for Nigeria:

- **Surveillance:**

Regular monitoring of maize fields for WCR presence and damage is essential.

- **Integrated Approach:**

Combining various management strategies, including crop rotation, resistant varieties (if available), and biological control agents, is likely to be most effective.

- **Awareness and Education:**

Raising awareness among farmers about the pest and its management options is crucial.

- **Research and Development:**

Further research into the specific biology and ecology of WCR in the Nigerian context is needed to develop tailored management strategies.