



Hawaii Farm Stewardship Report

2021

////// AGRICULTURAL STEWARDSHIP PRACTICES

As farmers, our success depends on good stewardship practices that protect and sustain precious soil and water resources. We partner with the **USDA Natural Resources Conservation Service** to develop and implement conservation plans for our farms. Some of our stewardship practices include:



COVER CROPS such as grasses, legumes or small grains provide vegetative cover to protect water, reduce soil erosion, improve soil quality and support nutrient management.



FALLOW PERIODS, also called regenerative agriculture, are time intervals during which crops are not grown in the field. Fallow periods allow the land to rest and help reduce pests by removing their preferred food source for a while. While this approach doesn't eliminate all pests, it reduces their population growth to a more manageable level.



LIGHT AND PHEROMONE TRAPS are among a wide range of physical tools and methods we use to monitor for pests in our crops. Other physical tools include sticky traps (like fly paper), protective netting (like window screens) and perimeter fences to keep wild animals out of our fields.



In addition to cover crops, **BENEFICIAL INSECT REFUGES** and **FIELD BORDERS** provide food and habitat for important pollinators like bees and butterflies. Beneficial insects such as ladybugs and lacewings also help to naturally control insect pests that damage crops.



NATIVE HABITAT RESTORATION promotes biodiversity and native species by restoring and managing rare or declining habitats that support local wildlife species. For example, Bayer has planted miles of native Hawaiian plants as natural windbreaks on our Molokai farm.



Each of our farms follows a **SOIL AND WATER CONSERVATION PLAN** to reduce erosion and increase water infiltration into the soil. Among other efforts, our land management practices include buffer strips, grassed waterways, terracing, sediment basins and contour farming.



WINDBREAKS AND SHELTERBELTS involve planting one or more rows of trees or shrubs to provide shelter from the wind and protect soil from erosion.



IRRIGATION CONTROL includes water-efficient drip irrigation, underground pipelines and management practices to control the rate, amount and timing of irrigation water to minimize soil erosion and reduce water loss. Bayer uses only recycled R1 water, where available, for irrigation and non-potable water needs.



MODERN TECHNOLOGIES enable us to manage our farms more efficiently and successfully and to continue improving our practices as we learn more. Modern technologies include GPS equipment, weather stations, moisture and temperature probes and digital tools like GIS and spreadsheet applications to gather, track and analyze data that help us better manage our crop protection efforts.

INTEGRATED PEST MANAGEMENT

All farmers need to be able to manage pests. Insects, weeds and diseases can have a devastating effect on crop yield and quality, and farmers need to have a variety of tools available to help control them.

Like other farmers, Bayer uses Integrated Pest Management (IPM) practices – a system of robust evaluations, careful decision-making and methodical controls – to determine how best to limit pest damage safely, sensibly and economically. Many of these practices are commonly used on organic as well as conventional farms.

An IPM system starts with scouting and considers multiple approaches to protecting a crop:

- Physical controls such as barriers or traps can eliminate pests directly.
- Biological controls leverage a pest’s natural enemies (“good bugs” like ladybugs eating “bad bugs” like aphids).
- Chemical controls use modern pesticides in a deliberate and targeted manner.

All of these approaches are used by farmers and land managers to effectively manage pests over the long-term.

FIELD SCOUTING

Just as you monitor your home and yard for problems and pests, farmers keep a close eye on their crops, assessing plant growth, soil moisture, fertility levels, and damage from pests.

At Bayer, our fields are monitored multiple times a week by trained field scouts. Among the things they look for are overall plant health, weed populations, beneficial vs. damaging pest populations, and signs of plant disease.



If there’s a problem with plant health, the field scout will evaluate the cause. There could be several possibilities, such as non-optimal water or fertility, or damage from pests.

Once the cause is determined, we evaluate if any action should be taken, and what adjustments may be appropriate. If the field scout notices potential pest issues, we analyze whether or not a pesticide application is warranted. If it is, the field scout will notify the IPM manager so that the most precise product, with the smallest potential environmental impact, can be used to remedy the situation.

CONTINUING IMPROVEMENT

We continue to refine and improve our pest management practices as part of our ongoing effort to do better as we learn more. For example, we’ve been employing more digital tools – such as GIS and spreadsheet applications – to gather, track and analyze data about the pests on our farms, which help us better manage our crop protection efforts.

STEWARDING OUR FARMS

At Bayer, our stewardship practices include a wide range of tools and methods to reduce crop damage, promote biodiversity and ensure productive, sustainable farms. Here are some of the tools we use to care for our farms:



COVER CROPS

Cover crops like grasses and legumes keep soil healthy, suppress weeds, attract beneficial insects, and reduce unwanted pests and diseases.



PERIMETER FENCES

Perimeter fences prevent wild animals that cause crop damage from entering fields.



STICKY TRAPS

Sticky traps capture flying pests, similar to fly paper or roach traps.



PROTECTIVE NETTING

Netting protects plants the same way that window screens keep pests out of homes.



TIMED PLANTING

We use weather conditions, good timing and best planting locations to our advantage.



BORDER PLANTS

Growing border plants around fields intercepts many pests before they reach our crops.



FIELD INSPECTIONS

Just as buildings can be inspected for termites, we inspect our fields frequently to identify pests before they overwhelm crops.



PRECISION APPLICATORS

When pest pressures become too great, precision application equipment distributes the right amount of pesticides at the right rate in the right location.

Bayer is committed to sustainable agriculture and to being a good steward of Hawaii's natural resources. Learn more about what we do to support conservation and sustainability in the islands.



Farmers use pesticides, including organic and synthetic products, to control pests in their fields. Pesticides are also used by homeowners, businesses and government agencies, in gardens and yards, on golf courses, in buildings, along public roadways and in parks to control weeds, insects and animal pests.

FEDERAL AND STATE OVERSIGHT

All commercial pesticides must be reviewed and approved by the U.S. Environmental Protection Agency (EPA) before they can be sold or distributed in the United States.

The EPA's review of a pesticide is called a risk assessment. The EPA typically reviews over 100 studies as part of its extensive evaluation process, which includes safety assessments for both short-term and long-term exposure, risk factors to key groups of people including children and the elderly, and environmental safety considerations.



The EPA only approves products that pass its risk assessment. And, even after a pesticide is approved by the EPA, it remains subject to ongoing evaluation.

Pesticides used in Hawaii must also be registered by the State. A database of all pesticide products licensed in Hawaii is available at <https://opendata.hawaii.gov/dataset/current-expired-product-list>.

In 2018, the State of Hawaii also established new public reporting requirements for restricted use pesticide (RUP) usage.

THE LABEL IS KEY: HERE'S WHY

As a result of the EPA's risk assessment, all approved pesticides must have a label which provides information about the product and how to apply it safely.

A pesticide label provides specific instructions for when, how, how often, and how much of a product can be used. It may also spell out the environmental conditions under which a product can be applied, as well as what equipment can be used and other conditions that must be met before a pesticide can be used.

The labels help ensure pesticides are applied in a responsible and safe manner. Failure by an applicator to use a pesticide product in accordance with its label instructions can result in significant fines and penalties.

Bayer employees who work with pesticides receive training every year regarding proper pesticide use. The Hawaii Department of Agriculture (HDOA) administers the testing for certified applicators of Restricted Use Pesticides. HDOA can also review our pesticide application records and inventories at any time.

BAYER 2021 RESTRICTED USE PESTICIDES (RUP)

Bayer owns or leases approximately 8,400 acres in Hawaii and we are committed to being good caretakers of our farmland. And, we willingly share information about our farming practices; to learn more, please visit our website (hawaii.bayer.us) where you can also sign up for a free e-newsletter and free farm tour” with “or follow us on social media @bayerhawaii.

We use a wide range of tools and methods to care for our crops; pesticides are just one of them. Our stewardship practices include a robust program to reduce crop damage, promote biodiversity, protect native plants, and ensure we maintain healthy crops and productive, sustainable farms.

While the precise formulations may differ, many of the active ingredients in agricultural RUPs are also used in common household products, such as insect sprays and lawn products, to control unwanted pests. And, we only apply the right product in the right amount needed depending on the kind of pest problem we’re facing. That’s why, in some cases, the number of gallons of a certain product we use in a year is very limited – often less than the number of gallons of gas in a typical car tank.

Bayer has been voluntarily and publicly sharing information about our RUP usage in Hawaii since 2014, and this report is an important part of our commitment to transparency (see table on page 7). Bayer also submits information about our annual RUP usage to the Hawaii Department of Agriculture (HDOA) in compliance with new reporting requirements enacted by the State in 2018. Please note that HDOA’s reports under Act 45 may be formatted or presented differently from our Hawaii Farm Stewardship report.



2021 RESTRICTED USE PESTICIDES

COMMERCIAL PRODUCT	ACTIVE INGREDIENTS	USED FOR	ACRES TREATED	PRODUCT USED (GALLONS)
Asana® XL Insecticide	Esfenvalerate	Armyworms, Corn Earworm, Aphids, Cutworms. Also found in household foggers.	10.86	0.68
Beseige® Insecticide	Chlorantraniliprole / lambda-Cyhalothrin	Armyworms, Corn Earworm, Lesser Corn Stalk Borer, Aphids, Cutworms and Sap Beetles. Also found in household products to fight lawn pests.	170.93	13.26
Coragen® Insect Control	Chlorantraniliprole	Armyworm, Corn Earworm. Also found in household product to fight grubs.	17.1	0.87
Dual II Magnum®	S-Metolachlor	Foxtail, Sandbur, Nutsedge, Radish, Mustard, Goosegrass, Pigweed, Purslane.	37.99	9.41
Mustang® Insecticide	Zeta-Cypermethrin	Cutworms, Corn Earworm, Sap Beetles, Aphids, Armyworm. Also found in household products to fight garden pests, fire ants, and termites.	29.53	0.76
Mustang® Maxx Insecticide	Zeta-Cypermethrin	Cutworms, Corn Earworm, Sap Beetles, Aphids, Armyworm. Also found in household products to fight garden pests, fire ants, and termites.	35.29	1.08
Tombstone™ Insecticide	Cyfluthrin	Armyworms, Corn Earworm, Leafhoppers. Also found in household products to fight lawn pests.	123.3	2.70

PESTICIDES REFERENCES & RESOURCES

ENVIRONMENTAL PROTECTION AGENCY

<https://www.epa.gov/pesticides>

NATIONAL PESTICIDE INFORMATION CENTER

<http://npic.orst.edu/>

NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES AGRICULTURAL HEALTH STUDY

<https://aghealth.nih.gov/>

HAWAII LICENSED PESTICIDE LISTING

<https://opendata.hawaii.gov/dataset/current-expired-product-list>

COLLEGE OF TROPICAL AGRICULTURE AND HUMAN RESOURCES, UNIVERSITY OF HAWAII AT MANOA, HAWAII PESTICIDE LAWS AND REGULATIONS

<https://cms.ctahr.hawaii.edu/epp/Education/Study-Guide-Packets/Hawaii-Pesticide-Laws-and-Regulations>

CROPLIFE AMERICA

<https://www.croplifeamerica.org/resources>

FDA PESTICIDE RESIDUE MONITORING SYSTEM

<https://www.fda.gov/Food/FoodborneIllnessContaminants/Pesticides/ucm2006797.htm>

USDA PESTICIDE DATA PROGRAM

<https://www.ams.usda.gov/datasets/pdp>



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