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Seed Treatment Stewardship Guide

Key elements for stewarding treated seeds.

CropLife AMERICA

www.seed-treatment-guide.com

The Guide to Seed Treatment Stewardship

DISCLAIMER

The Seed Treatment Stewardship Guide (Guide) is solely intended as an educational tool and general guidance to assist growers in voluntarily developing and implementing stewardship practices related to the use of treated seed. This Guide serves as a reference document only and is not exhaustive.

It is the responsibility of any user of this document to consider that user's specific circumstances in 1) developing a stewardship plan specific to their business; and 2) meeting any applicable legal and regulatory requirements. This Guide is not intended as, and should not be construed as, legal advice or a substitute for a user's own individual understanding of applicable legal requirements. Regulatory requirements may be issued or revised by government agencies after the publication date of this Guide. Users are advised to consult with their legal counsel and/or contact the appropriate regulatory agency or agencies to ensure compliance with applicable requirements.

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Overview of Seed Treatment

SEED TREATMENT

The application of products and/or materials to seed that are intended to alter or enhance seed appearance, protect seed from damage, optimize the seed's ability to take advantage of environmental conditions or the application process and performance of other treatment components.

Treatment components may include pesticides; non-pesticidal products that support plant health, growth, or nutrient sequestration; or other materials such as colorants, polymers, coating materials, drying agents, safeners or water.

SEED TREATMENTS AS A PART OF U.S. AGRICULTURE

The use of seed treatment technologies by farmers is an effective tool to provide the necessary protection of seeds for a strong, healthy crop start. Seed treatments deliver a very precise application of pesticide that protects seeds from the insects, nematodes and diseases in the soil during early developmental stages. This protection helps ensure that the plant has a greater opportunity to grow a strong root system which is the foundation of a healthy, productive plant. Seed treatments can also guard against insect or disease damage during a plant's most vulnerable developmental stages and help maximize the performance potential of each seed.

In addition, seed treatments have the potential to reduce the environmental impact of the production process by decreasing the number of spray applications of pesticides and lessening exposures to non-target species, including

PESTICIDE SEED TREATMENT

Pesticides (biopesticides or synthetic chemistry) applied to the seed that suppress, control, or repel plant pathogens, insects, nematodes, or other pests that can damage seeds and seedlings. Pesticide seed treatments are regulated under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) by the US Environmental Protection Agency (USEPA) and state law by state pesticide regulators. Seeds treated with pesticides should only be used in compliance with seed treatment product labels and seed bag tag language.

NON-PESTICIDE SEED TREATMENT

Products and materials such as inoculants, micronutrients, seed coating materials, colorants, safeners, etc. may also be applied to the seed to enhance seed properties and seed treatment application processes, improve seed health, or meet pesticide label requirements (e.g., colorants that clearly identify the fact that seed has been treated). Colorants may also be added to enhance the aesthetics and appearance of treated seed or to differentiate seed types or treatments (e.g. refuge components in insect-protected corn seed).

Non-pesticide materials may also be added to enhance or alter physical seed properties. This can include bulking seed to improve handling by planting equipment, adding coating to enhance seed flow, improving treatment on-seed drying time, or enhancing adherence of other seed treatment components to reduce material loss and dust.

Biostimulant or nutrient products can be added to provide fertility to developing seedlings or enhance the soil and plant health.

Applicators using these materials and products are responsible to understand product use directions, impacts to seed performance, and regulatory requirements associated with their use or use of seed treated with these materials/products.

humans and pollinators. Seed treatments have been used for decades and, thanks to advances in technology, treatment options have evolved to control or protect against additional threats to maximize the yield potential while reducing risk to applicators and the environment.

Pesticide seed treatments have been widely used and a focus for innovation since the 1980s. These innovations have contributed to increasing crop yields, depending on the crop, anywhere from 3.6% (soybeans) to 71.3% (potatoes).

Citation:
https://growingmatters.org/wp-content/uploads/2017/04/report-aginfomatics-metaanalysis-yield-report-2014.pdf

KEYS FOR SUCCESSFUL SEED TREATMENT USE

It is essential to develop good practices and appropriately train those who treat, handle, transport, and plant the seed to help ensure that seed treatments result in success for everyone involved. Any handling of seed could potentially impact seed quality. Seed handlers, treaters, and applicators need to be aware that they could be responsible for any such impact and should take care when handling seed for any purpose.

Treater/Applicator

- Follow all directions on labels of pesticide products applied to seed and all instructions on the seed bag tag.
- Establish written application protocols using best practices to help ensure high quality seed treatment application with proper product adhesion to the seed, and to minimize pesticide "dust off" from the seed during sowing.
- Properly discard unused seed treatment products, unusable treated seed, and rinse water in accordance with all federal and local requirements in order to minimize environmental impact.
- Comply with all regulations for registered pesticide products and ensure proper employee training.

Handler

- Confirm appropriate PPE and engineering controls (i.e. dust/waste collection, cleanout) are utilized, and treated seed is stored as specified by the product labels for all treatments applied to the seed. If applying a secondary treatment (overtreatment), whether a pesticidal or non-pesticidal treatment, on top of seed previously treated, consult the labels from all products applied to the seed (original and overtreatment) and comply with the strictest PPE, engineering controls, and storage directions.

Consumer (Planter operator)

- Be aware of the wind direction and speed prior to, and during, planting, as well as foraging pollinators, hive locations, and flowering habitats including weeds and other plants at field edges or nearby. Take appropriate actions prior to and during sowing operations to minimize potential human and environmental exposures.

Other factors for those involved in treating seed that require consideration are:

- Comply with all regulations for registered pesticide products and ensure proper employee training.
- Evaluate Standard Operating Procedures (SOPs) and ensure the proper practices are in place to prevent unintended transfer of seed treatment residues to commodities when equipment is shared for multiple purposes.
- Follow the label directions for proper handling and storage practices for a treated seed product.
- Be aware of wind direction and speed and the presence of foraging pollinators, hive locations, flowering habitats including weeds and other plants at field edges or nearby, and aquatic habitats.
- Establish written application protocols using best practices to help ensure high quality seed treatment application to minimize potential for poor adhesion of the treatment to the seed and release into the environment prior to placement of the seed below ground (dust off).
- Adopt stewardship documentation for the full life cycle of seed treatment products.
- Help ensure that all required and pertinent seed treatment information is conveyed to end users (growers) through product labels, seed tags and education.
- Ensure no treated seed enters the commodity grain channels. (reference guidance, if possible)

SECTION 1: [Applicator]

SELECTION OF TREATMENT PRODUCTS

As described above, there are a number of products and materials that can be applied to seed, each with a specific purpose. It is commonplace that more than one product or type of material is applied to seed.

Multiple products and materials are applied together or in sequence during a treating process. For the purposes of this document, the complete list of seed treatment products applied to a batch of seed and the protocol defining the application timing and process will be referred to as a "seed treatment recipe." Selecting a seed treatment recipe should be based on an evaluation of the agronomic needs of the field(s), soil characteristics, product registration status (if applicable based on the product type), product efficacy, compatibility with other products, seed safety data, seed flowability, coverage and visual appearance, adhesion of treatment to the seed, plantability of treated seed, application limitations (air and seed temperature), humidity considerations, drying requirements, registration, etc. Each seed treatment recipe should be evaluated and verified to be suitable for each crop.

The subsections below provide additional details for consideration:

I. Treatment Selection Considerations

- Consult product labels for crop registration, pests controlled, application rates, active ingredient, and any use restrictions.
- Use only recommended rates to control target pests listed on the label.

II. Safety

- Review seed treatment product(s) label(s) for verification of seed safety for the specific treatment product(s) on the crop to be treated.
- Verify treated seed storage stability time is sufficient for typical commercial storage times.
- Read and follow the product label and seed bag tag instructions to understand any safe handling or planting requirements and recommendations.

III. Application Requirements and Process Verification

- Determine if the treatment equipment to be used for the application of the product/recipe is appropriate or will require modifications and/or upgrading.
- Test runs of the specific recipe should be conducted in small-scale application equipment and/or commercial equipment. Specifically note:
  - Product compatibility issues
  - Application rates and treating throughput

- Product drying characteristics and build up on equipment
- Treated seed flowability, caking, or clumping
- Seed coverage and appearance
- Plantability in appropriate equipment types
- Dustiness of treated seed
- Document all observations to validate commercial seed treatment start up

- Note: Manufacturers and/or consultants may be aware of existing processes for the application of the specific treatment recipe in other similarly equipped commercial operations that can potentially serve as a road map when testing and commercializing a new recipe.

SECTION 2: [Applicator]

APPLICATION OF SEED TREATMENT PRODUCTS

The quality of the treatment application process is dependent on the quality of the seed prior to treatment (seed integrity, dustiness), composition/quality of the seed treatment materials, the application rate on the seed, the process conditions (seed throughput, seed temperature, product temperature, air temperature/humidity, etc.), seed treatment recipes, the application equipment, and the skill of the operators. The following recommendations will help manage these factors for high-quality treated seed.

I. Use the full "life cycle" documentation approach for seed treatment products.

- Establish that information accompanying receipt of the treatment components (e.g., shipping documentation, lot numbers, Safety Data Sheets (SDS) for treatment components) is accessible, secure, and retained.
- Verify/inspect treatment products when received for quality and/or damage and log any expiration dates (may require first in, first out usage).
- Maintain records for treating seed batches: lot/batch numbers, units treated, quantity of treatments applied (reconcile with quantity of treated seed), treatment lot numbers used, application date, etc.
  - Reference EPA record-keeping guide and applicable seed law record requirements. [created in 2010] (*https://www.ams.usda.gov/rules-regulations/pesticide-records*)

- Develop a documented slurry preparation procedure. Include items such as a list of components, lot numbers, the sequence for combining ingredients, the name of the mixer/loader, and preparation date.
- Record all results of quality testing completed on the treated seed: coverage/appearance, adhesion of treatment flowability, plantability, seed germination and vigor, etc.
- Maintain documentation of treated seed sales, treated seed discard, treatment/slurry discard, rinse water discard, and packaging material discard.
- Maintain records of all treatment equipment calibration and maintenance.
  - Establish a document retention policy.

II. Train Personnel

- Establish documented training procedures for employees involved in seed treatment activities such as mixers/loaders, seed treatment equipment operators (applicators), packagers, cleaners, and forklift operators. Include hazardous material handling as specified on the treatment labels, SDSs or seed tag language as appropriate.
- Keep records of training certifications.
- Applicator certification personnel requirements must be followed, per EPA and state guidelines.
- Instruct personnel on selection and use of proper personal protective equipment (PPE). When selecting PPE, always read and follow seed treatment product labels and treated seed tag safety language. PPE typically includes long pants, long sleeved shirt/coveralls, chemical resistant gloves, shoes, socks, and may also include respirators, etc.
  - Where respirators are being used, for more information refer to: *https://www.osha.gov/respiratory-protection/general*; or *Respiratory Protection for Occupational Users of Pesticides (Rutgers NJAES)*
- Individuals must always read and follow the seed treatment product labels.
- Also reference and use required or suggested PPE as indicated by equipment manufacturers for operation of equipment used to treat, handle, or transport treated seed. Additional PPE may include eye, ear, foot, respiratory and/or head protection.
- Emergency Plan Training
  - Have an emergency preparedness plan for unintended exposures, spills, or accidents.
  - Have any relevant emergency contact information easily accessible.
  - In the event of an emergency, call the manufacturer's Product Emergency Number.

III. Establish an Application Process

- Applicators should ensure best practices are implemented and followed when applying seed treatment products as they are responsible for the seed they treat.
- Start with high quality seed (germination, purity, vigor, seed integrity, conditioning, etc.). For more information, review *ASTA's Guide to Seed Quality Management*.
- Verify the lot/batch number of the seed to be treated.
- Select/locate the documented recipe for the treatment products and crop.
- Determine if sufficient usable quantities of all recipe components are in stock.
- Verify shelf life of components where applicable.
- Verify treating equipment is capable of accurately and uniformly applying the chosen recipe to the target crop seed.
- Applicators, mixers/loaders, etc. should read and understand all seed treatment product label directions and precautions, SDS and any supplemental manufacturer's recommendations for all components of the treating recipe. Note that following the pesticide product label application instructions is a regulatory requirement for use.
- When applying multiple registered products, comply with all label requirements of the individual components.
- Prepare slurries, if needed.
- Ensure application equipment is free of treatment contamination from the previous batch by following a documented change over procedure when changing treatment recipes.
- Properly calibrate/adjust the treating equipment for each seed treatment recipe.
- Periodically monitor physical properties (e.g., tackiness, seed flow, visible dust off) and appearance (e.g., uniformity, color) of treated seed during the treatment process. Also frequently inspect equipment for any buildup of treatment materials.
- Verify application rate (options include calibration verification, mass balance of applied material and seed throughput, and analysis of treated seed).
- Ensure the proper information is transferred for the container/tag language (See Section 3). Verify location.
- Establish and use documented procedures for the handling, control, and proper disposal of unused slurry components, empty packaging materials, waste, and treated seed.
- Establish and follow treater cleanup procedures.
- When using fully automated enclosed system treaters, ensure all calibrations are properly set.

IV. Overtreatment

- Overtreatment is the application of a second seed treatment recipe to previously treated seeds.
- Assess whether overtreating will impact any product warranties covering the seed, or the original or secondary treatment products.
- All the procedures listed previously in this section are applicable.
- Compatibility with the original treatment active ingredient(s) needs to be verified.
- If the overtreatment contains any of the same active ingredients in the original application, the total amount cannot exceed maximum label rates. Consult the labels of the seed treatment products used in the original treatment and overtreatment.
- Follow the established regulations when overtreatment is prescribed.
- Samples of the overtreated seed may be required to be retained by applicable law and are recommended to be retained per lab standards for that crop seed and overtreatment used (samples of each before and after overtreatment).
- Note: Overtreatment can also impact the seed integrity and/or the seed-to-seed distribution of the original treatment. Therefore, a one-time application of all seed treatment products is the preferred process. Monitor overtreatment to verify it does not impact seed integrity (dust off, wash off, flowability, singulation, loss of A.I. load, etc.).

V. Handling Treated Seed

- Ensure handlers are aware of all seed treatment safety and stewardship label and bag/tag language.
- Avoid personnel exposure to dust when filling or opening/emptying packaged treated seed or transferring bulk treated seed.
- Properly dispose of any spillage to minimize exposure to people, livestock, wildlife, and the environment. (Refer to disposal guidelines noted in Section 5 of this document for more detailed information)

VI. Transporting Treated Seed

- All treated seed that is transported must be accompanied by proper documentation. Read and understand seed treatment tag language and follow directions that require seed treatment tag language to be printed on or attached to the treated seed containers/packages or be contained in shipping documents for bulk treated seed.
- Note seed treatment product manufacturer or seed company phone number for specific product questions. Also note any emergency or medical center contact information.

- Protect treated seed from direct sunlight, extreme heat, and moisture.
  - Avoid undue mechanical abrasion and damage to the treated seed and packaging to minimize seed treatment dust-off, maintain seed quality, and to reduce spillage.
  - In case of spills, collect the treated seed immediately, and properly dispose of spillage to minimize exposure to humans, livestock, wildlife, and the environment. **Refer to disposal guidelines noted in Section 5 of this document for more detailed information.*
- Assess whether Department of Transportation regulations are applicable.

IV. Planting of Treated Seeds [Farmer]

A. Use of Seed-flow Lubricants

- Follow recommendations from planter manufacturers for use of seed flow agents or lubricants.
- Avoid excess use rates of lubricants to minimize dust and to avoid build-up of unwanted residue.

B. Planting

- Identify the potential pest or disease before selecting seed treatments based on historical or other information.
- Read and understand planting instructions found on seed treatment tags and follow planting requirements that are printed on or attached to the treated seed bags and/ or containers or contained in shipping documents for bulk treated seed.
- Survey the field to be planted, field borders, and nearby land for the presence of managed bee hives, flowering crops, or weeds, which could attract pollinators.
- Eliminate flowering plants and weeds in and immediately adjacent to the field prior to planting treated seeds.
- Avoid dust drift from treated seeds to sensitive areas during planting by observing wind speed and direction.
- Use high-quality clean and conditioned seed
- Follow manufacturer recommendations/procedures for calibration, operation, and maintenance as specified in the planter operator manual.
- For pneumatic planters, direct air exhaust downward towards the soil surface, if possible, to decrease the potential of dust drift.
- Fill the planter at least 10 yards inside the field, avoiding proximity to managed bee hives, hedges, or flowering crops or weeds.
- When opening seed containers or when filling and emptying the planter, position yourself upwind to avoid any released dust.

- Avoid shaking the bottom of the seed bag when filling the planter to reduce the release of any dust that may have accumulated during transport.
- When using planter box treatments, consult with the manufacturer to help ensure the product will not increase abrasion and drift of treated seed products.
- Always plant the treated seed at the recommended seeding rate and depth as listed on the seed tag.
- Ensure all seed is covered by soil to minimize exposure to wildlife and the environment.
- Follow plant back restrictions found on the seed tag or referenced elsewhere.
- Dispose of seed packaging and/or containers in accordance with local requirements and container return policies.
- Proper PPE should be used in accordance with the seed tag instructions.

C. Cleaning of Planting Equipment

- It is not recommended to use the same transport and conveyance equipment for bulk treated seed as for the harvested commodity. If the same equipment must be used, the equipment must be disassembled, kernel cleaned, and all residue removed from all surfaces by scraping, vacuuming, and washing of all surfaces. **There is zero tolerance for treated kernels in the commodity grain channel when the treated seed tag states the seed is not for food, feed, or oil purposes.**
- Clean planters and seed boxes away from sensitive environmental areas. Be aware of and avoid field margins with flowering crops or weeds and managed hives.
- Do not use compressed air as it may lead to significant dust drift.
- Do not dump rinse water on soil, surface water, ground water, or in septic systems. Rinse water should be disposed of per local and federal regulations.

SECTION 3:

TREATED SEED LABELING

The Federal Seed Act (FSA) and state seed laws mandate that treated seed containers have labels that provide information to allow seed customers and handlers to make informed choices and to adhere to "best management practices" for use. The U.S. Environmental Protection Agency (EPA) routinely requires specific additional information on the seed tag, via instructions on the labels of seed treatment pesticides. All entities throughout the seed supply chain should ensure that the seed tag language is accurate and up to date.

I. Treated Seed container/bag tag language:

- Every container of treated seed must be labeled per regulations promulgated under the FSA: "Not to be used for food, feed or oil purposes," along with the identity of the active ingredient(s) used to treat the seed.
- The bill of lading must include a copy of the bag tag. Additional container/bag tag language may be required as specified in the EPA-approved label for pesticides used for seed treatment.
- Note that all seeds treated with chemical pesticides, except for hopper planter box application, must be colored with an "EPA approved dye or colorant that imparts an unnatural color to the seed" [40 CFR §153.155I]. Additional local, state, and federal requirements may apply.
- Instructions and requirements for the safe use of seed treatment products and safe handling and transport of treated seeds are detailed on the treatment product label. Label language requirements for storage and transportation of treated seed must be added to the treated seed container/tag or shipping documents for bulk seed.

SECTION 4:

STORAGE OF SEED TREATMENT PRODUCTS AND TREATED SEEDS

I. Seed Treatment Product Storage:

- Follow local, state, and federal regulations for facility construction requirements including a well-ventilated space that is equipped for adequate containment of seed treatment products in the event of spillage/leakage of containers.
- Consult local, state, federal guidelines for requirements on storage facilities.
- Follow product label instructions for storage, especially regarding temperature guidelines, time/expiration factors and container disposal requirements.

- Documentation involving emergency response procedures and contacts, including the SDS's for all seed treatment products and/or other chemicals held in storage, should be available.
- Pesticides must be kept secure from children, livestock, wildlife, pests, and unauthorized persons.
- See exposure guidelines referenced in Section 5 of this document.

II. Treated Seed Storage:

- Treated seed should be protected from extreme temperatures and moisture. The storage facility should have good ventilation, block direct sunlight, and be dry.
- Treated seed must be secure from children, livestock, wildlife, pests, and unauthorized persons.
- Consult local, state, and federal guidelines for requirements on storage facilities.
- Be aware that seeds treated with biologicals may have special requirements.
- See exposure guidelines referenced in Section 5 of this document.

SECTION 5:

MANAGEMENT OF NON-VIABLE SEED TREATMENT PRODUCTS AND TREATED SEEDS

I. Excess Small Quantities of Pesticide-Treated Seed

- Information on how to dispose of and handle excess seed is typically found on the seed tag.
- Refer local, state, and federal authorities for applicable disposal regulations. See *The Pesticide Stewardship Alliance*.
- Return excess treated seed to its original seed lot containers if the seed is intended for storage and subsequent planting.
- Leftover treated seed may be double sown around the headland or buried away from the water sources in accordance with local requirements.

II. Disposal of Rinse Water from Seed Treatment Equipment

- Do not dump rinse water into ground water, surface water, or unapproved septic systems.
- Never exceed the volume of rinse water which meets permitted volume requirements of the approved wastewater disposal/treatment system.

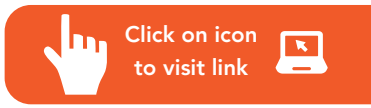
- Re-use rinse water, if possible, to dilute the next batch of formulation but only if using the same seed treatment recipe. Factor in the potential for increased concentration of active ingredient(s) if significant amounts of rinse water are used.

DISPOSAL OF LARGE VOLUMES OF PESTICIDE-TREATED SEED

- Refer to local, state, and federal authorities for applicable disposal regulations. See *The Pesticide Stewardship Alliance*.
- Whether a facility has the proper permits to dispose of a "particular pesticide" can only be determined by directly contacting the specific facility. Due diligence should be practiced by the disposer (farmer, dealer, seed company, owner, etc.) to ensure the facility receiving the product is properly permitted and the product is handled according to the permit.
- High Temperature Incineration by a Waste Management Facility
  - These facilities are in the disposal business, but confirmation of the proper permits is still needed.
- Alternative Fuel Source for Power Plants or Cement Kilns
  - There are a variety of power plants that utilize alternative fuels, such as biomass, municipal solid waste, or non-fossil waste.
- Alternative Fuel Source
  - Properly permitted industrial facilities may use treated seed as an alternate power source.
- Disposal in an Approved Permitted Landfill
  - Disposal in approved permitted landfills is allowed in some states depending on the specific products used to treat the seed.
  - Determine if the treated seed, and the resultant seed dust, seed screenings, and other waste related to treated seed are federally classified as hazardous wastes under Federal Regulation Title 40--Protection of Environment, Chapter I- Environmental Protection Agency, Subchapter I-Solid Wastes, Part 261 Identification and listing of Hazardous Waste (40 CFR.261).
  - Note that some states may have more stringent solid waste disposal regulations than others. In addition, treated seed, and resultant seed dust, are subject to solid waste regulations at the state and local levels. Always check state and local regulations prior to disposing of treated seed or dust.

RESOURCES:

Disclaimer: The external links provided in this guide are intended for use as additional, external supplementary resources for the reader. Neither the American Seed Trade Association nor CropLife America is responsible for their content.



EPA LINKS

- Environmental Protection Agency General
- Environmental Protection Agency – Label Review Manual – Chapter 18: Unique Product
- Pesticide Labeling Questions
- Apply Pesticides Correctly, a Guide for Commercial Applicators
- Wastes-Hazardous Wastes
- Federal Insecticide, Rodenticide and Fungicide Act (FIFRA)
- Federal Regulation Title 40 – Protection of Environment, Chapter I – Environmental Protection Agency, Subchapter I-Solid Wastes, Part 261 Identification and listing of Hazardous Waste
- State Sites for Solid and Hazardous Waste

USDA LINKS

- USDA Home page
- Agricultural Marketing Service-Seed Regulatory and Testing Services

Click on icon to visit link

SEED LAW/REGULATIONS

- Federal Seed Act (FSA)
- Association of American Pesticide Control Officials
- Association of American Seed Control Officials
- Recommended Uniform State Seed Law (RUSSL)
- Seeds Conditioning
- Principals of Seed Science and Technology

STEWARDSHIP RESOURCES

- The Pesticide Environmental Stewardship Website

TRAINING RESOURCES

- PERC (Pesticide Education Resources Collaborative)
- National Pesticide Safety Education Center
- The American Association of Pesticide Safety Educators

DISPOSAL RESOURCES

- The Pesticide Stewardship Alliance (TPSA)
- Pesticide Environmental Stewardship

LABELING LINKS

- CDMS
- Agrian (software)

Click on icon to visit link

ASSOCIATION RESOURCES

- Ag Retailers Association
- American Seed Trade Association
- Association of Equipment Manufacturers
- CropLife America
- National Association of State Departments of Agriculture
- Pollinator Partnership

The Guide to Seed Treatment Stewardship

www.seed-treatment-guide.com