

# Create Control - Data Entry

Control Number:

Alternate Number:

## Citizen Information

Citizen/Originator: 1). Morton, Dawson - 104 Mareitta Street, tlanta, GA 32706

Constituent:

Committee:

Sub-Committee:

## Control Information

Status:

Letter Date:

Received Date:

Contact Type:

Priority Code:

Addressee:

Addressee Org:

File Code:

Signature:

CC:

Signature Date:

Primary Subject:

Secondary Subject:

Instructions:

Instruction Notes:

General Notes:

\*: Required field

(+): Lookup field, press space bar for complete list

LISA J. KRISHER  
DIRECTOR OF LITIGATION

DAWSON MORTON  
SENIOR STAFF ATTORNEY

LAURA RIVERA  
THEODORE ROETHKE  
STAFF ATTORNEYS

ISAAC RAISNER  
LAW ASSISTANT

HILARY SMITH  
PARALEGAL

**FARMWORKER RIGHTS DIVISION OF  
GEORGIA LEGAL SERVICES PROGRAM®  
SERVICIOS LEGALES PARA LOS TRABAJADORES AGRÍCOLAS**

104 MARIETTA STREET, SUITE 250  
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(404) 463-1633 FAX (404) 463-1623  
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<http://www.glsp.org>

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DIRECTOR OF FINANCE

October 1, 2015

Velveta Golightly-Howell  
Director, Office of Civil Rights  
U.S. Environmental Protection Agency  
Mail Code 1201A  
1200 Pennsylvania Avenue, NW  
Washington, DC 20460  
*Via US Mail*  
*Via E-mail to: Title\_VI\_Complaints@epa.gov*

Dear Director Golightly-Howell,

This letter constitutes a Title VI civil rights complaint pursuant to 40 C.F.R. § 7.120 against the Georgia Department of Agriculture for its failure to provide migrant farmworkers access to the protections to which they are entitled under the Worker Protection Standard (“WPS”), 40 C.F.R. § 170 *et seq.*, on the basis of their race and national origin in violation of 40 C.F.R. § 7.35.

**I. Factual Background.**

Georgia Legal Services is a non-profit law firm that provides free civil legal services in rural Georgia. The Farmworker Rights Division provides legal services specifically to migrant and seasonable agricultural workers. We represent (b) (6) Privacy a migrant agricultural worker in the United States on an H-2A temporary agricultural visa to work at Vidalia Plantation, Inc., an affiliated corporate entity of Plantation Sweets, Inc., a large South Georgia farm located in Cobbtown, GA. Both Vidalia Plantation, Inc. and Plantation Sweets, Inc. are owned and operated by Ronald A. Collins. This complaint refers to all three, collectively, as “the agricultural employer.”

On August 5, 2015, I filed a WPS complaint on behalf of (b) (6) Privacy with the Georgia Department of Agriculture. Ex. 1 (Aug. 5, 2015 WPS complaint). The complaint concerned a July 8, 2015 exposure to pesticide event, during which (b) (6) Privacy and other workers were exposed to pesticides when the agricultural employer caused tobacco fields to be sprayed with an



anti-suckering agent while the workers labored in the field deflowering tobacco. Indeed, using his phone (b) (6) Privacy recorded a video of the active sprayer bearing down on workers as they scrambled out of its path. The workers were then ordered to immediately re-enter the field (b) (6) Privacy and other workers experienced severe nausea from the pesticide exposure.

I contacted both the U.S. DOL OSHA and the Georgia Department of Agriculture, which receives federal funds from the EPA to implement the provisions of the Federal Insecticide, Fungicide, and Rodenticide Act (“FIFRA”), 7 U.S.C. § 136w, and its attendant regulations, including the WPS regulations. To my knowledge both OSHA and the Georgia Department of Agriculture conducted preliminary inquiries, and then the matter was referred to the Georgia Department of Agriculture for primary investigation.<sup>1</sup>

Nancy Hall, Program Operation Specialist for Pesticide Complaints and Enforcement with the Georgia Department of Agriculture informed me by telephone that the Georgia Department of Agriculture had no Spanish-speaking investigators capable of interviewing (b) (6) Privacy and I asked her to contact me if that changed. Ex. 2 (July 16, 2015 email from D. Morton to N. Hall). The following week, she informed me that the Georgia Department of Agriculture would find a means of translation, and requested (b) (6) Privacy name and contact information. Ex. 3 (July 20, 2015 email from N. Hall to D. Morton).

(b) (6) Privacy was concerned about retaliation and, accordingly, I inquired whether the Georgia Department of Agriculture’s complaint and investigation process had any confidentiality protections. I was informed by Thomas Gray, Director of the Plant Industry Division of the Georgia Department of Agriculture, that there would not be any confidentiality protections. Nonetheless, (b) (6) Privacy made the decision to come forward as a complainant, and, on August 5, 2015, I filed a WPS complaint on his behalf. I submitted the complaint to both Mr. Gray and Ms. Hall. The complaint stated that (b) (6) Privacy could be made available for an interview with Spanish-language translation.

On September 29, 2015, Ms. Hall informed me that the Georgia Department of Agriculture would not conduct an interview of (b) (6) Privacy. She stated that they did “not have the resources to conduct an interview with the complainant” because “[t]ranslator services would require a fee which is not included in [the Department’s] budget.” Ex. 4 (Sept. 29 email from N. Hall to D. Morton). Ms. Hall also stated that the case was “completed” and would be “referred to EPA Region 4 for their enforcement consideration.” Despite the voluminous evidence of violations of both the WPS and Georgia state law, there was no indication that the Georgia Department of Agriculture would take any enforcement action.<sup>2</sup>

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<sup>1</sup> OSHA informed me that they do not have regulatory authority to enforce the WPS standards, but that they did find other violations of OSHA regulations in the course of their inquiry.

<sup>2</sup> This is consistent with a disturbing trend documented by our office, wherein Georgia state government agencies accept federal funds that obligate the agencies to enforce protections for agricultural workers, but then the agencies decline to undertake enforcement action. Our office has documented such conduct not only by the Georgia Department of Agriculture, but also by the Georgia Department of Labor, which accepts Wagner-Peyser Act funds, but has declined to enforce its attendant regulations, e.g., 20 C.F.R. § 658.400 (Job Service Complaint System).

**II. The Department's Refusal to Provide Translation Services for Complainant Interviews Disadvantages Farmworker Complainants of Account of their Race and National Origin in Violation of Title VI of the Civil Rights Act of 1964.**

Title VI of the Civil Rights Act of 1964 provides that “[n]o person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance.” 42 U.S.C. § 2000d. The United States Supreme Court has held that Title VI prohibits discrimination on the basis of limited English proficiency (“LEP”). *See Lau v. Nichols*, 414 U.S. 563, 568 (1974).

The United States Department of Justice (“DOJ”) has issued formal guidance to federal financial assistance recipients regarding Title VI’s prohibition against national original discrimination affecting LEP persons. *See* 67 Fed. Reg. 41,455 (June 18, 2002). The DOJ “coordinates government-wide compliance with Title VI and its interpretation of Title VI is entitled to special deference.” *United States v. Maricopa County*, 915 F. Supp. 2d 1073, 1080 (D. Ariz. 2012). This guidance provides that, to determine the extent of its obligation to provide LEP services, a federal financial assistance recipient must consider four factors: (1) The number or proportion of LEP persons eligible to be served or likely to be encountered by the program or grantee; (2) the frequency with which LEP individuals come in contact with the program; (3) the nature and importance of the program, activity, or service provided by the program to people’s lives; and (4) the resources available to the grantee/recipient and costs.” 67 Fed. Reg. 41,455, 41,459.

These factors overwhelmingly dictate that the Georgia Department of Agriculture must provide Spanish-language translation services to WPS complainants. Migrant farmworkers are disproportionately foreign-born and Hispanic. *See* U.S. Department of Labor, FINDINGS FROM THE NATIONAL AGRICULTURAL WORKERS SURVEY 2001-2002, A DEMOGRAPHIC AND EMPLOYMENT PROFILE OF UNITED STATES FARM WORKERS 3-4 (2005) at 3-4 (78% of crop workers interviewed in the 2001-2002 survey were foreign-born, and 83% identified themselves as Hispanic). This is true even in a state such as Georgia, which has a slightly higher percentage of non-foreign-born and non-Hispanic agricultural workers. Accordingly, hand-labor agricultural workers, for whom the WPS pesticide regulations were promulgated, will overwhelmingly require services and documents in Spanish in order to be provided access to WPS protections or be interviewed for a WPS complaint. Moreover, given serious effects of pesticide exposure, WPS complaints regarding pesticide exposure are of great importance to people’s lives. Finally, while the Georgia Department of Agriculture’s position is that translation would require a fee which is not included in the Department’s budget, the reality is that the Department is a large, well-funded state agency with an annual budget of over \$40 million, approximately \$7 million of which is provided by the federal government. *See* Nathan Deal, THE GOVERNOR’S BUDGET REPORT, FISCAL YEAR 2015 (2015) at 99. The Department cannot avoid its Title VI obligations simply by failing to budget for compliance therewith.

October 1, 2015  
Title VI Complaint

Accordingly, I urge your office to conduct an investigation into the Georgia Department of Agriculture's compliance with its anti-discrimination obligations under 40 C.F.R. §§ 7.10-7.135 in regard to its enforcement of the WPS regulations, and to take the steps necessary to ensure that all persons in Georgia, regardless of their national origin, race, or migrant farmworker status, have access to the pesticide-related protections to which they are entitled under federal law.

Pursuant to 40 C.F.R. § 7.120(c), please notify me of your agency's receipt of this complaint within five calendar days. I can be reached by telephone at (404) 463-1633 or by e-mail at [dmorton@glsp.org](mailto:dmorton@glsp.org). In addition, I am available to elaborate on any of the matters discussed in this letter.

Sincerely,

*s/ Dawson Morton*

Dawson Morton  
Senior Staff Attorney  
Farmworker Division  
Georgia Legal Services Program

LISA J. KRISHER  
DIRECTOR OF LITIGATION

DAWSON MORTON  
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DIRECTOR OF FINANCE

August 5, 2015

Thomas Gray  
Director, Plant Industry Division  
Georgia Department of Agriculture  
19 Martin Luther King, Jr. Drive, S.W.  
Atlanta, GA 30334  
*Via Facsimile: (404) 657-8378*  
*Via Electronic Mail: [thomas.gray@agr.georgia.gov](mailto:thomas.gray@agr.georgia.gov)*

**Re: Worker Protection Standards Complaint of (b) (6) - Privacy**

Dear Mr. Gray,

I write to submit an official Worker Protection Standards complaint on behalf of (b) (6) Privacy who has retained the Farmworker Rights Division of the Georgia Legal Services Program. This complaint concerns a July 8, 2015 exposure-to-pesticide incident in a tobacco field under cultivation by Ronald A. Collins, Plantation Sweets, Inc., and Vidalia Plantation, Inc. (collectively, "the agricultural employer"). The facts of this complaint are as follows:

1. (b) (6) Privacy was recruited in Mexico and hired by the agricultural employer to perform agricultural work on an H-2A temporary agricultural worker visa that was issued on April 7, 2015. (b) (6) Privacy is currently in lawful, authorized immigration status.
2. On July 8, 2015, (b) (6) Privacy and other hand-labor agricultural workers were instructed to enter a tobacco field in Cobbtown, GA under cultivation by the agricultural employer in order to deflower tobacco plants by hand. After the incident, (b) (6) Privacy took a photograph of the entrance to the field, just outside the Cobbtown welcome sign. Exhibit A. The field has GPS coordinates (b) (6) Privacy and its location is marked on page 2 the attached Exhibit A. Tattnall County property records included on page 3 of Exhibit A indicate that this field is owned by the agricultural employer.

3. As (b) (6) Privacy and other workers labored in the field, the agricultural employer caused the field to be sprayed. All the workers were exposed and numerous workers experienced nausea. (b) (6) Privacy reports smelling a strong chemical after the application, which caused him to feel nausea. After the spraying, the workers were ordered to immediately re-enter the field. (b) (6) Privacy can be made available for an interview. He will require Spanish-language translation.
4. Using his phone, (b) (6) Privacy took photographs and recorded video of the sprayer in the field as workers labored in the same field or scrambled out of the field as the sprayer bore down on them. A selection of the photographs is attached as Exhibit B. The video can be made available upon request, and shows workers exiting tobacco rows only moments before an active sprayer exits the same rows. The video shows the active sprayer moving down the entire length of the field, exiting the field, turning 180°, and re-entering the field to continue spraying.
5. On a subsequent day, (b) (6) Privacy took a photograph of a chemical container present in the field. (b) (6) Privacy had seen the same container in the field on the day of the exposure incident. The photograph is attached as Exhibit C, and indicates that the chemical was Drexel Sucker-Plucker, an anti-suckering agent. The complete EPA-approved pesticide label is attached as part of Exhibit C, and shows that the chemical has a Restrict Entry Interval (“REI”) of 24 hours. On the advice of our office, (b) (6) Privacy saved the clothing that another worker present in the field (and visible at second 20 of the video) was wearing during the incident. The clothing can be made available to your agency for testing.
6. As a result of initial inquiries by our office, you conducted a preliminary investigation of the incident. Your agency was apparently told that agricultural employer “was using this field to calibrate a sprayer and had only water in the tank.” Exhibit D (email of Thomas Gray to Dawson Morton, dated July 23, 2015). The agricultural employer’s explanation has no credibility. The video taken by (b) (6) Privacy clearly shows the sprayer under motion for an extended period of time, moving through the entire field as it sprays. And the video clearly shows that no liquid was captured for measurement. All available literature indicates that calibration testing is to be done in short intervals with the sprayer standing still so that the water can be collected for measurement. *See, e.g.,* Paul E. Sumner and Michael J. Bader, “Calibration Method for Sprayers and Other Liquid Applicators,” UNIVERSITY OF GEORGIA COOPERATIVE EXTENSION CIRCULAR 683 (February 2012), available at [http://extension.uga.edu/publications/files/pdf/C%20683\\_3.PDF](http://extension.uga.edu/publications/files/pdf/C%20683_3.PDF); *see also* P.D. Ayers and B. Bosley, “Sprayer Calibration Fundamentals,” COLORADO STATE UNIVERSITY EXTENSION FACT SHEET 5.003 (September 1992), available at <http://www.ext.colostate.edu/pubs/farmmgmt/05003.pdf> (articles attached as Exhibit E).
7. The agricultural employer’s conduct in causing the field to be sprayed while hand-labor workers were in the field, and then ordering the workers to immediately re-enter the freshly sprayed field, violated the Worker Protection Standards promulgated under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), 7 U.S.C. § 136w, and its attendant regulations. *See* 40 C.F.R. § 170.110(a) (prohibiting the agricultural employer

- from allowing or directing any person, except the applicator, to remain or enter a treated area “during the application of any pesticide on a farm”); 40 C.F.R. § 170.112(a) (prohibiting the agricultural employer from allowing or directing any hand-labor agricultural worker to enter or remain in a treated area “[a]fter the application of any pesticide . . . before the [REI] specified on the pesticide labeling has expired”).
8. The agricultural employer has also violated section 12(a)(2)(G) of the FIFRA by using a “registered pesticide in a manner inconsistent with its labeling.” 40 C.F.R. § 170.9(a). As a result, the agricultural employer is subject to civil penalties and criminal sanctions under section 14 of the FIFRA. 40 C.F.R. § 170.9(b).
  9. The Georgia Department of Agriculture has authority to enforce these provisions of the FIFRA pursuant to the Georgia Pesticide Use and Application Act of 1976, O.C.G.A. § 2-7-96(2). This complaint is filed within 60 days of the incident, and is therefore timely under O.C.G.A. § 2-7-110(b). This complaint is not submitted on a form devised by the Georgia Department of Agriculture because no such form is publically available on the department’s website, <http://agr.georgia.gov/pesticides.aspx>.
  10. In addition, the agricultural employer has violated the Georgia Pesticide Control Act of 1976, O.C.G.A. § 2-7-62(b)(3) (“It shall be unlawful . . . [f]or any person to use or cause to be used any pesticide in a manner inconsistent with its labeling or the regulations of the Commissioner”), and its attendant regulations, Rules and Regulations 40-11-10-.01(2)(c) (“It shall be unlawful for any person to . . . [h]andle . . . or distribute any pesticide in a manner that would endanger man . . .”). As a result, the agricultural employer may be guilty of a misdemeanor under state law. O.C.G.A. § 2-7-73.

Accordingly, on behalf of (b) (6) Privacy I formally request that you open a formal investigation into this incident, enforce the federal Worker Protection Standards and Georgia state law, and assess penalties on the agricultural employer. Please do not hesitate to contact me at (404) 463-1633 or [dmorton@gfsp.org](mailto:dmorton@gfsp.org) if you have further questions about this complaint.

Sincerely,

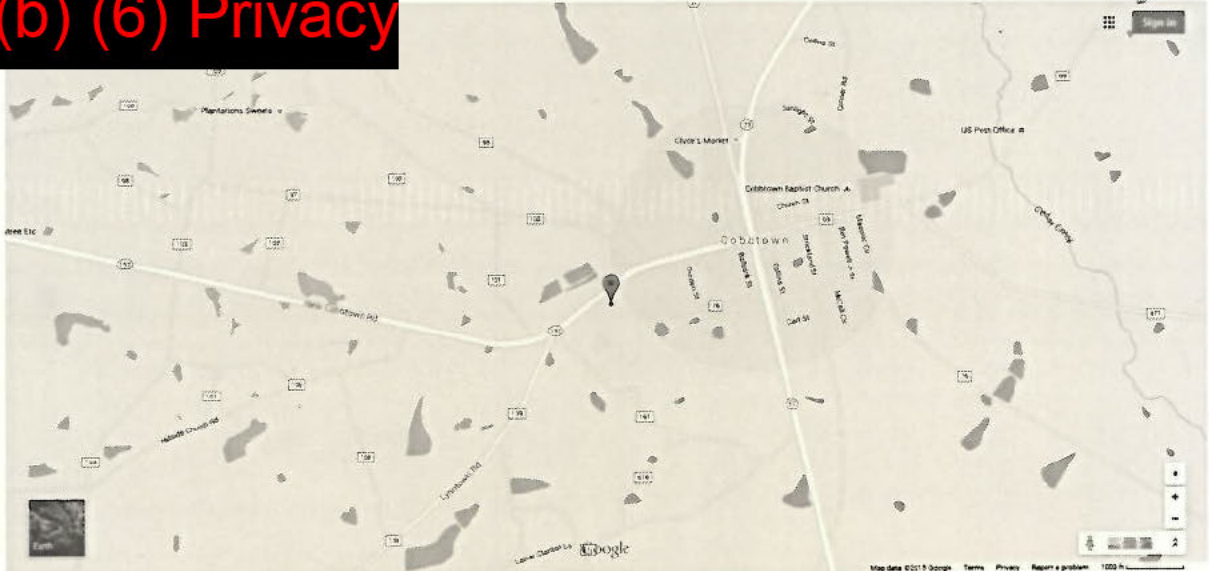
Dawson Morton  
Senior Staff Attorney  
Farmworker Rights Division  
Georgia Legal Services Program

Copy to: Nancy Hall  
Program Operation Specialist  
Pesticide Complaints and Enforcement  
Via Electronic Mail: [nancy.hall@agr.georgia.gov](mailto:nancy.hall@agr.georgia.gov)



# EXHIBIT A

**(b) (6) Privacy**



Map of field location created using GPS coordinates taken by **(b) (6) Privacy**

Reports  
Parcel

View as: Google Earth | Bird's Eye | Google Maps & Street View

PARCEL INFORMATION TABLE

Selected Parcel	01B.04B. (Click for Complete Card)
Class Code (NOTE: Not Zoning Info)	V5
Taxing District	COUNTY
Acres	60.44

OWNERSHIP INFORMATION

Name	COLLINS RONALD A
Mailing Address	1632 ROMY COLLINS ROAD COBETOWN, GA 30420
Situs/Physical Address	6033 W HWY 152

VALUES

Land Value	\$80,700.00
Improvement Value	\$31,200.00
Accessory Value	\$500.00
Total Value	\$112,400.00

LAST 2 SALES

Date	Price	Reason	Qual

Website last updated June 26, 2015  
GIS Maps last updated April 17, 2015

Parcel List  
Legend  
Measure

Copyright © 2010 of Public.net

Tattall County property records for field indicating ownership by Ronald A. Collins.

# EXHIBIT B

# EXHIBIT C

19713-35

8/1/2014

1/7



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

OFFICE OF CHEMICAL SAFETY  
AND POLLUTION PREVENTION

Ms Luz G Chan  
Drexel Chemical Company  
PO BOX 13327  
Memphis, TN 38113-0327

AUG 01 2014

Subject: Product Name: Sucker-Plucker Concentrate  
EPA Reg. No. 19713-35  
Submission date: 1/13/14  
Resubmission dates: 7/28/14 & 7/29/14  
Amendment: Add "broadcast boom" application, clarify use directions, formatting  
and other changes for harmonization across Drexel tobacco labels  
Decision Number 487452

Dear Registrant:

The amendment referred to above, submitted in connection with registration under the Federal Insecticide, Fungicide and Rodenticide Act as amended is acceptable under FIFRA 3 (c) (5).

A stamped copy of your labeling is enclosed for your records. This labeling supersedes all previously accepted labeling. You must submit one (1) copy of the final printed labeling before you release the product for shipment with the new labeling. In accordance with 40 CFR 152.130(c), you may distribute or sell this product under the previously approved labeling for 18 months from the date of this letter. After 18 months, you may only distribute or sell this product if it bears this new revised labeling or subsequently approved labeling. "To distribute or sell" is defined under FIFRA section 2(gg) and its implementing regulation at 40 CFR 152.3.

If you have questions concerning this letter, please call Banza Djapao at 703-305-7269, or via email at [djapao.banza@epa.gov](mailto:djapao.banza@epa.gov) or you may call me at 703-308-9443.

Sincerely,

A handwritten signature in black ink that reads "Tony Kish".

Tony Kish  
Product Manager 22  
Fungicide Branch  
Registration Division (7504P)

*Evan Wong* 2/7

**ACCEPTED**  
AUG 01 2014  
Under the Federal Insecticide,  
Fungicide, and Rodenticide Act,  
as amended, for the pesticide  
registered under  
EPA Reg. No. 19713-35



**Drexel**  
**Sucker-Plucker®**  
Concentrate

Tobacco Sucker Control Agent

**ACTIVE INGREDIENTS:**

- Fatty Alcohols..... 85.0%
  - Octanol (C<sub>8</sub>) - 36.35%
  - Decanol (C<sub>10</sub>) - 48.39%
  - Related Compounds (Dodecanol - C<sub>12</sub>) - 0.26%

**OTHER INGREDIENTS:** ..... 15.0%

**TOTAL:** ..... 100.0%

This product contains 6.04 pounds of active ingredients per gallon.

**KEEP OUT OF REACH OF CHILDREN.**

**DANGER / PELIGRO**

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

**See FIRST AID Below**

EPA Reg. No. 19713-35  
EPA Est. No. 19713-XX-XXX

Net Content: \_\_\_\_\_

FIRST AID	
<b>IF IN EYES:</b>	<ul style="list-style-type: none"> <li>• Hold eye open and rinse slowly and gently with water for 15 to 20 minutes.</li> <li>• Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.</li> <li>• Call a poison control center or doctor for treatment advice.</li> </ul>
<b>IF ON SKIN OR CLOTHING:</b>	<ul style="list-style-type: none"> <li>• Take off contaminated clothing.</li> <li>• Rinse skin immediately with plenty of water for 15 to 20 minutes.</li> <li>• Call a poison control center or doctor for treatment advice.</li> </ul>
<b>IF SWALLOWED:</b>	<ul style="list-style-type: none"> <li>• Call a poison control center or doctor immediately for treatment advice.</li> <li>• Have person sip a glass of water if able to swallow.</li> <li>• Do not induce vomiting unless told to do so by a poison control center or doctor.</li> <li>• Do not give anything to an unconscious or convulsing person.</li> </ul>
<b>IF INHALED:</b>	<ul style="list-style-type: none"> <li>• Move person to fresh air.</li> <li>• If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible.</li> <li>• Call a poison control center or doctor for further treatment advice.</li> </ul>
Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact CHECTREC at 800-424-9300 for emergency.	
<b>Note to Physician:</b> Probable mucosal damage may contraindicate the use of gastric lavage.	

35SP-0714\*P

**PRECAUTIONARY STATEMENTS**

**Hazards to Humans and Domestic Animals**

**DANGER:** Corrosive. Causes irreversible eye injury. Causes skin irritation. Do not get in eyes, on skin or on clothing. Harmful if swallowed, inhaled or absorbed through the skin. Avoid breathing spray mist.

**PERSONAL PROTECTIVE EQUIPMENT (PPE)**

Some materials that are chemical-resistant to this product are listed below. If you want more options, refer to Category C on EPA chemical-resistance category selection chart.

**Mixers, loaders, applicators, and other handlers must wear:** Protective eyewear (goggles or eyeshield), coveralls over a short-sleeved shirt and short pants, chemical-resistant gloves made of any waterproof material (butyl rubber, nitrile rubber, neoprene rubber, polyvinyl chloride, or viton), socks, chemical-resistant footwear, a chemical-resistant apron when mixing/loading or cleaning equipment, and chemical-resistant headgear for overhead exposure.

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them.

**USER SAFETY RECOMMENDATIONS**

**Users should:** 1) Wash hands before eating, drinking, chewing gum, using Tobacco or using the toilet. 2) Remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. 3) Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

**ENVIRONMENTAL HAZARDS**

Do not apply directly to water or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters or rinsate.

**PRODUCT INFORMATION**

SUCKER-PLUCKER Concentrate is a carefully balanced combination of active ingredients and wetting agents (surfactants) to be used for the control of sucker growth on all types of Tobacco. The concentrated product is diluted with water to form a creamy emulsion which is applied as a coarse spray. The emulsion is effective only when it comes in direct contact with the suckers. Wet the sides of the Tobacco stalk with the spray and contact all small, immature suckers. This product is a contact material, thus, if plants are leaning it is necessary to straighten those plants so the emulsion flows down the stalk evenly and contacts each sucker axil or sucker bud. This material can be used alone, or may be followed by a systemic sucker control agent in a dual treatment program.

**DIRECTIONS FOR USE**

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Do not apply this product through any type of irrigation system. Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.



**AGRICULTURAL USE REQUIREMENTS**

Use this product only in accordance with its labeling and with the Worker Protection Standard (WPS), 40 CFR Part 170. This standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, greenhouses and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted entry interval (REI). The requirements in this box only apply to uses of this product that are covered by the WPS.

Do not enter or allow worker entry into treated areas during the REI of 24 hours.

PPE required for early entry to treated areas that is permitted under the WPS and that involves contact with anything that has been treated, such as plants, soil or water is: Protective eyewear (goggles or face-shield), coveralls over short-sleeved shirt and short pants, chemical-resistant gloves made of waterproof material (such as butyl rubber, nitrile rubber, neoprene rubber, polyvinyl chloride, or viton), socks, chemical-resistant footwear, and chemical-resistant headgear for overhead exposure.

**TIME OF APPLICATION**

This product may be applied either before or after topping at the button to early flower stage. Best results are usually obtained by making the first application before topping, and as soon as 50 to 60 percent of the plants have a visible button. Floral parts help to intercept sprays increasing sucker control in the upper leaf axils. Remove Tobacco plant terminals that are in the elongated button stage as soon as possible after the first application. This product is most effective when applied at 3 to 5 day intervals and when humidity is low and leaf axils are fully exposed. Optimum time for application is generally between 10:00 A.M. and 6:00 P.M. on sunny days. The best results are obtained when plants are sprayed in the morning after the dew dries or in the afternoon when the plants have recovered from wilt. Some injury may occur to tender leaves at the top of the plants from an application of this product under bright sunlight at temperatures above 90°F. Injury may result if this product is applied to the underside of Tobacco leaves during high winds sufficient enough to turn leaves and such applications are not recommended. Do not apply during rain or to wet plants. If this material has been applied to Tobacco plants for over one hour prior to rain or irrigation, reapplication should not be necessary.

**MIXING INSTRUCTIONS**

The diluted emulsion is most easily prepared by adding the required amount of this product into the spray tank one-half filled with water using mild agitation. Then add sufficient water to the spray tank to total the required minimum solution.

**Note:** In order to minimize the possibility of injury to Tobacco plants, do not mix this product with other Tobacco chemicals such as insecticides, fungicides and herbicides, or apply this product to plants that have recently been treated with such chemicals.

**RATE OF APPLICATION**

**Flue-cured and Burley Tobacco:** For the first application, dilute this product at the rate of 1.75 to 2 gallons in sufficient water to total a minimum of 50 gallons spray solution. For the second application in Flue-cured Tobacco, the rate of this product may be increased by diluting 2.5 gallons in sufficient water to total a minimum of 50 gallons spray solution 3 to 5 days after the first application. For extended sucker control, this product may be applied as needed, but not to exceed 7 times per crop, at the rate of 2.5 gallons in sufficient water totaling a minimum of 50 gallons of spray solution. Applications may also be made under optimum growing conditions and heavy sucker pressure applied weekly 3 to 4 weeks after maleic hydrazide has been applied.

**Dark Tobacco:** Dilute this product at the rate of 2 to 2.5 gallons in sufficient water totaling a minimum of 50 gallons of spray solution. Apply the specified lower rate when optimum growing conditions exist and leaves are tender. Otherwise, apply the specified higher rate. When applied by hand, 1 gallon of diluted product will treat approximately 250 plants. If a power sprayer is used, apply a minimum of 50 gallons spray solution per acre.

5/7

## METHODS OF APPLICATION

### Hand Application

This product may also be applied with hand-held equipment or with backpack sprayer. Apply as a coarse spray directed downward at the top of the stalk from 6 to 8 inches above the top leaves. Low tank pressure is required, and in no case should more than about 20 to 25 pounds per square inch (psi) be used.

### Powered Spray Equipment

**Broadcast Application:** When applying as a broadcast spray or straight boom application, use one nozzle directed over the center of the row and one nozzle directed over the center of the row- middle (TG-3, TG-5 full cone tips or equivalent). Maintain a coarse spray using 25 to 35 psi boom pressure. By using TG-3 spray tips, spraying at 25 to 35 psi pressure and operating at a speed of 1.5 to 3 mph, apply in a minimum of 50 gallons of diluted emulsion per acre of Tobacco. By using TG-5 spray tips, spraying at 25 to 35 psi pressure and operating at a speed of 3 to 5 mph, apply a minimum of 50 gallons of diluted emulsion per acre of Tobacco. Apply the diluted product to Tobacco as a coarse spray from a height of 12 to 16 inches above the top of the stalk.

**Directed Application (3 Nozzles):** When applying as a directed spray, use three nozzles per row (TG-3, TG-5 full cone tips or equivalent). Direct one TG-5 nozzle downward over the center of the row and TG-3 nozzles (9 inches on each side) directed at or slightly above the top of the stalk. Keep boom pressure at 20 to 25 psi and should never exceed 30 psi. By using TG-3, TG-5 spray tips, spraying at 20 to 25 psi pressure and operating at a speed of 2.5 to 3 mph, apply a minimum of 50 gallons of diluted emulsion per acre of Tobacco. Apply the diluted product to Tobacco as a coarse spray from a height of 12 to 16 inches above the top of the stalk.

**Use Precautions:** If allowed to stand for extended periods of time, the diluted emulsion may separate. Always remember to mix well immediately before using and maintain agitation during application. All sprayers should be equipped with a pressure regulator and a pressure gauge.

## APPLICATION NOTES

1. Application of this product at concentrations higher than specified may cause leaf damage.
2. Be sure spray equipment is clean prior to use.
3. After adding this product to the spray tank, start-up and maintain good agitation of the diluted solution.
4. Do not apply this product to wet plants, such as immediately after heavy rain or irrigation or when there is a heavy dew present.
5. Do not apply on windy days since the spray solution may not be deposited uniformly on the leaf axils and sucker buds.
6. Do not spray during excessive temperatures in excess of 95°C or the middle of the day during heat stress since leaf burn may occur. Injury may also result if the product is sprayed on the underside of the Tobacco leaf, such as when the wind is strong enough to turn top leaves.
7. In Burley Tobacco, during prolonged periods of high heat and humidity or under other conditions favoring the spread of hollow stalk or stem rot diseases, delay application of this product until these conditions pass.
8. Closely hand-suckered or Tobacco treated with this product will not ripen as rapidly as poorly suckered Tobacco. Also, under some conditions, tips treated with this product have a tendency to turn yellow prematurely. This is not harmful and does not mean that your Tobacco is ripe. Therefore, do not harvest Tobacco treated with this product by using time and color of the leaves as your only guide to ripeness. Use other characteristics indicative of ripeness such as (a) fading of color from midrib, and (b) change in apparent leaf texture.
9. Do not harvest within 7 days of application.

## NUMBER OF APPLICATIONS

In many cases a single application of this product is satisfactory to control both primary and secondary suckers. If secondary sucker growth appears vigorous, prompt follow-up treatments within 5 to 7 days after the initial treatment may be advantageous. Excellent leaf quality can be obtained with the use of this product when applying

sequential applications. Some growers favor a dual treatment using this product first (at the button stage) followed 1 to 2 weeks later with a systemic sucker control agent (maleic hydrazide such as Super Sucker-Stuff, Sucker-Stuff and Sucker-Stuff 80EG) used in accordance with manufacturer's instructions. DO NOT apply this product more than seven times per crop.

**ADDITIONAL TREATMENT PROGRAMS**

**Flue-Cured Tobacco:** If sucker growth is vigorous or if development of Tobacco in the field is irregular, second and third applications of this product, at 3 to 5 day intervals may be needed. For these additional applications, use 2 to 2.5 gallons of this product in sufficient water per acre to total a minimum of 50 gallons spray solution. Within 7 to 10 days after the last application of this product, apply Super Sucker-Stuff, Sucker-Stuff, or Sucker-Stuff 80EG at the labeled rate and timing.

**Air-Cured (Burley, Cigar or Maryland):** Application of this product may be followed in 7 to 10 days by Super Sucker-Stuff, Sucker-Stuff, or Sucker-Stuff 80EG at the labeled rate and timing. If a systemic material is not used, a second application of this product may be made 5 to 7 days after the first application.

**TANK MIX APPLICATIONS**

**Flue-Cured Tobacco:** A tank mixture of this product plus Super Sucker-Stuff, Sucker-Stuff, or Sucker-Stuff 80EG may be applied to Flue-cured Tobacco at the early flower growth stage. This tank mixture application will usually follow application of a contact sucker control agent. Before treatment, top the Tobacco and remove all suckers over one inch in length. Direct the spray mixture to the upper one-third of the plant and operate the sprayer at low pressure similar to that of a contact application. This will ensure that the droplets are large enough for the mixture to run down the stalk. Use normal spray precautions, such as those used while applying contact material agents.

**Notes:**

1. Use only one application of the tank mix per growing season.
2. Do not harvest within 3 weeks of last application if this product is tank mixed with Maleic Hydrazide.
3. All applicable directions, restrictions and precautions are to be followed.

**STORAGE AND DISPOSAL**

Do not contaminate water, food or feed by storage or disposal.

**STORAGE:** Storage should be under lock and key in a ventilated room and secure from access by unauthorized persons and children. Storage should be in a cool, dry area away from any heat or ignition source. Do not stack containers over 2 pallets high. Move containers by handles or cases. Do not move containers from one area to another unless they are securely sealed. Keep containers tightly sealed when not in use. Keep away from any puncture source. Avoid storage near water supplies, food, feed and fertilizer to avoid contamination. Avoid contamination with oxidizing materials. Store in original containers only. If the contents are leaking or material is spilled, follow these steps:

1. Contain spill. Absorb with a material such as sawdust, clay granules or dirt.
2. Collect and place in suitable containers for disposal.
3. Wash area with soap and water to remove remaining pesticide.
4. Follow washing with clean water rinse.
5. Place a leaking container in plastic tub and transfer contents, as soon as possible, to an empty original container.
6. Do not allow runoff to enter sewer or contaminate water supplies.
7. Dispose of waste as indicated below:

**PESTICIDE DISPOSAL:** Wastes resulting from the use of this product may be disposed on site or at an approved waste disposal facility.

(continued)

(continuation)

**CONTAINER HANDLING:**

**Nonrefillable Container (rigid material; less than 5 gallons):** Nonrefillable container. Do not reuse or refill this container. Offer for recycling, if available. Clean container promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container one-fourth full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Dispose of empty container in a sanitary landfill or by incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of smoke.

**Nonrefillable Container (rigid material; 5 gallons up to < 250 gallons):** Nonrefillable container. Do not reuse or refill this container. Offer for recycling, if available. Clean container promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container one-fourth full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times. Dispose of empty container in a sanitary landfill or by incineration, or if allowed by State and local authorities, by burning. If burned, stay out of smoke.

**Refillable Container (≥ 250 gals. & Bulk):** Refillable container. Refill this container with pesticide only. Do not reuse this container for any other purpose. Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or mix tank. Fill the container about 10% full with water. Agitate vigorously or recirculate water with the pump for 2 minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times.

**WARRANTY—CONDITIONS OF SALE**

OUR DIRECTIONS FOR USE of this product are based upon tests believed reliable. Follow directions carefully. Timing and method of application, weather and crop conditions, mixtures with other chemicals not specifically recommended and other influencing factors in the use of this product are beyond the control of the Seller. To the extent consistent with applicable law, Buyer assumes all risks of use, storage and handling of this material not in strict accordance with directions given herewith. To the extent consistent with applicable law, in no case shall the Manufacturer or the Seller be liable for consequential, special or indirect damages resulting from the use or handling of this product when such use and/or handling is not in strict accordance with directions given herewith. The foregoing is a condition of sale by the Seller and is accepted as such by the Buyer.

Manufactured By:



**Drexel Chemical Company**

P.O. BOX 13327, MEMPHIS, TN 38113-0327

**SINCE 1972**

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# EXHIBIT D

**From:** "Gray, Thomas" <[Thomas.Gray@agr.georgia.gov](mailto:Thomas.Gray@agr.georgia.gov)>

**Date:** July 23, 2015 at 9:49:54 AM EDT

**To:** Dawson Morton <[dawson@gagr.org](mailto:dawson@gagr.org)>, "Hall, Nancy" <[Nancy.Hall@agr.georgia.gov](mailto:Nancy.Hall@agr.georgia.gov)>

**Cc:** "Hall, Nancy" <[Nancy.Hall@agr.georgia.gov](mailto:Nancy.Hall@agr.georgia.gov)>

**Subject:** RE: Plantation Sweets

Good morning Mr. Morton,

Once we have completed our investigation he would not have any confidentiality protections. Our case files are subject to the Georgia Open Records Act. I'm not sure what his concern is. We need someone involved in the incident to come forward and tell us exactly what they experienced and provide documentation they were in fact sprayed by this farmer. As of this stage in the investigation our information indicates the grower was using this field to calibrate a sprayer and had only water in the tank. Without a "complainant" we have no case of alleged pesticide misuse.

Thank you,

Tommy Gray

# EXHIBIT E

# Calibration Method for Sprayers and Other Liquid Applicators

Paul E. Sumner and Michael J. Bader  
Extension Engineers

The procedure below is based on spraying 1/128 of an acre per nozzle or row spacing and collecting the spray that would be released during the time it takes to spray the area. Because there are 128 ounces of liquid in 1 gallon, this convenient relationship results in ounces of liquid collected being directly equal to the application rate in gallons per acre.

Calibrate with clean water when applying toxic pesticides mixed with large volumes of water. Check uniformity of nozzle output across the boom. Collect from each for a known time period. Each nozzle should be within 10 percent of the average output. Replace with new nozzles if necessary. When applying materials that are appreciably different from water in weight or flow characteristics – such as fertilizer solutions, etc. – calibrate with the material to be applied. Exercise extreme care and use protective equipment when active ingredient is involved.

**Step 1.** Determine type of application to be made and select appropriate procedure from Table 1. *Example:* Herbicide Broadcast, Procedure A.

Table 1. Corresponding procedures for different spray applications		
Type of Application	Procedure	Coverage Basis
<i>Herbicide, Insecticide, Nematicide, Fungicide or Liquid Fertilizer</i>		
Broadcast	A	Broadcast (gal/acre)
Band	B	Broadcast (gal/acre of band)
Row	C	Row (gal/acre of row)
<b>Note:</b> Determine and use average row spacing for modified row patterns. Use width of area covered per row as row spacing in skip row patterns.		

**Step 2.** Using procedure A, B or C below as selected in Step 1, determine appropriate calibration distance from Table 2.

- (A) **Broadcast Application:** Outlets or nozzles must be evenly spaced. Measure outlet (nozzle, etc.) spacing. Find this spacing in left column of Table 2 and read the corresponding calibration distance. *Example:* For a 19-inch spacing, the distance would be 214.9 feet.
- (B) **Band Application:** Measure band width. Find this band width in the left column of Table 2 and read the corresponding calibration distance. *Example:* For a 12-inch band, the distance would be 340.3.
- (C) **Row Application:** Measure row spacing for evenly spaced rows. Find this row spacing in the left column of Table 2 and read the corresponding calibration distance from the column on the right. *Example:* For a 38-inch row spacing, the distance would be 107.5 feet. (See note above for modified and skip rows.)



- Step 3.** Measure and mark calibration distance in a **typical** portion of the field to be sprayed.
- Step 4.** With all attachments in operation (harrows, planters, etc.) and traveling at the desired operating speed, determine the number of seconds it takes to travel calibration distance. Be sure machinery is traveling at full operating speed the full length of the calibration distance. Mark or make note of engine RPM and gear. **Machine must be operated at same speed for calibration.**
- Step 5.** With sprayer sitting still and operating at same throttle setting or **engine RPM** as used in Step 4, adjust pressure to the desired setting. **Machine must be operated at same pressure used for calibration.**
- Step 6.** For procedure (A), Step 2, broadcast application – Collect spray from **one** nozzle or outlet for the number of seconds required to travel the calibration distance.
- For procedure (B), Step 2, band application – Collect spray from **all** nozzles or outlets used on one band width for the number of seconds required to travel the calibration distance.
- For procedure (B), Step 2, row application – Collect spray from **all** outlets (nozzles, etc.) used for one row for the number of seconds required to travel the calibration distance.
- Step 7.** Measure the amount of liquid collect in fluid ounces. **The number of ounces collected is the gallons per acre rate** on the coverage basis indicated in Table 1. For example, if you collect 18 ounces, the sprayer will apply 18 gallons per acre. Adjust applicator speed, pressure, nozzle size, etc., to obtain recommended rate. If speed is adjusted, start at Step 4 and recalibrate. If pressure or nozzles are changed, start at Step 5 and recalibrate.

**CAUTION:** *Agricultural Chemicals can be dangerous. Improper selection or use can seriously injure people, animals, plants, soil or other property. Be Safe: Select the right chemical for the job. Handle it with care. Follow instructions on the container label and from the equipment manufacturer.*

**Table 2. Calibration distances with corresponding widths.**

Row Spacing, Outlet Spacing or Band Width (whichever applies) (inches)	Calibration Distance (feet)	Row Spacing, Outlet Spacing or Band Width (whichever applies) (inches)	Calibration Distance (feet)
48**	85.1	24	170.2
46	88.8	20	204.2
44	92.8	19	214.9
42	97.2	18	226.9
40	102.1	14	291.7
38	107.5	12	340.3
36	113.4	10	408.4
32	127.6	8	510.5
30	136.1		

To determine distance for spacing or band width not listed, divide the spacing or band width expressed in feet into 340.3. *Example:* For a 13" band, the calibration distance would be 340 divided by 13/12 = 314.1.

\*\* To increase calibration accuracy for a wide nozzle spacing, multiply calibration distance by a factor (for example, 2); then divide the fluid amount collected by the same factor for GPA. For narrow nozzle spacings with long calibration distances, divide calibration distance by a factor (for example, 4); then multiply the fluid amount collected by the same factor for GPA.

**Step 8.** To determine amount of pesticide to put into a sprayer or applicator tank, divide the total number of gallons of mixture to be made (tank capacity for a full tank) by the gallons per acre rate from Step 7 and use recommended amount of pesticide for this number of acres.

### **Band Application**

Use the recommended broadcast pesticide rates to make tank mixtures for band applications when calibrating with procedure (B) of this method. The number of gallons/acre determined in Step 7 are the gallons that will be applied to each acre of actually treated band.

To determine the gallons of spray mixture required to make a band application on a field, the number of acres that will be in the actually treated band must be determined. When all treated bands are the same width and all untreated bands are the same width, which is usually the case, the acres in the actually treated band can be calculated by placing the width of the treated band over the sum of the widths of the treated band and the untreated band, and multiplying this fraction times the number of acres in the field. *Example:* How many acres will actually be treated in a 30-acre field if a 12-inch band of chemical is applied over the drill of rows spaced 36 inches apart. The treated band width is 12 inches. The untreated band width is  $(36'' - 12'') = 24$  inches. Acres actually treated will be 12 inches divided by  $(12'' + 24'')$  times 30 acres = 10 acres. The amount of mixture required will be 10 times the number of gallons per acre from Step 7. The amount of chemical required will be 10 times the recommended broadcast rate for 1 acre.

Check rate recommendations carefully as to type of application, broadcast, band or row, and type of material specified, formulated product, active ingredient, etc.

### **Calculating Formulation Requirements for Active Ingredient Rates**

To determine amount of liquid pesticide required for a rate given in pounds of active ingredient per acre, divide recommended rate by pounds active ingredient per gallon stated on label. *Example:* Pesticide label states 4 lbs. active ingredient per gal. and recommends  $\frac{1}{2}$  lb. active ingredient per acre. Amount of pesticide required -  $\frac{1}{2}$  lb/A divided by 4 lb/gal = gal/A.

To determine amount of wettable powder required for a rate given in pounds active ingredient per acre, divide recommended rate by percent active ingredient stated on label. *Example:* Pesticide label states powder is 50 percent active ingredient. Two pounds of active ingredient are recommended per acre. Amount of pesticide powder required - 2 lbs AI/A divided by 0.5 AI/lb = 4 lbs/A.

# Learning *for* Life

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**Circular 683**

**Reviewed February 2012**

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# Sprayer Calibration Fundamentals

Fact Sheet No. 5.003

Farm and Ranch Series | Equipment



by P.D. Ayers and B. Bosley\*

Due to timeliness and effectiveness, chemical pesticide application has become a leading method of weed and insect control in U.S. agricultural production. The continued use of pesticides in the agricultural industry has led to concerns of chemical trespassing by groundwater contamination or drift.

Inaccurate pesticide application rates, spray patterns and droplet size can lead to pesticide movement from the targeted area and reduce the effectiveness of the pesticide. A recent study in Nebraska revealed that two-thirds of the applicators were applying pesticides improperly (application rate errors greater than 5 percent). A similar study conducted in North Dakota indicated that 60 percent of tested sprayers had calibration errors greater than 10 percent. Although inaccurate tank mixing causes some of these errors, a majority of the problems result from improper spray equipment calibration and worn nozzles.

## Nozzle Selection

The first step in sprayer calibration is to determine the correct nozzle type and size (flow rate). Flat-fan nozzles are used for broadcast spraying of most herbicides and some insecticides where a medium droplet size is needed. Flat-fan nozzles are used for banding herbicides. Flooding type and full cone nozzles used for pre-plant herbicides produce drift-resistant large droplets, and wide nozzle spacing can be used. Hollow cone nozzles produce smaller droplets and are used to apply insecticides and contact herbicides that need to penetrate the canopy.

Inaccurate applications can be due to nozzle wear. Therefore it is important to select the correct nozzle material. Wear-

resistant materials such as tungsten, carbide, ceramic and hardened stainless steel help nozzles maintain a constant flow rate after a long period of use. Nozzles made from less durable materials (plastic, brass) demonstrate increased flow rates after only a short period of spraying. For example, after 50 hours of spraying, a brass nozzle can have an increased flow rate of 10 to 15 percent, whereas a hardened stainless steel nozzle will increase only about 2 percent. The increased flow rates result from an increased nozzle orifice area. The added cost to purchase a more durable nozzle can pay for itself many times over by reducing the overapplication that results from nozzle wear.

Nozzle size depends on the desired application rate, ground speed and nozzle spacing. For each nozzle type and spray angle, the manufacturer recommends spray height and nozzle spacing. Nozzle spacings of 20 and 30 inches are most common. The desired flow rate from the nozzle can be determined from the following equation:

$$\text{GPM} = (\text{GPA} \times \text{MPH} \times w) / 5940$$

where:

GPM = the nozzle flow rate in gallons per minute,

GPA = the application rate in gallons per acre,

MPH = the ground speed of the sprayer in miles per hour (MPH = (ft/min) / 88),

and w = the nozzle spacing in inches for broadcast spraying.

## Calibration Procedure

### Spray Rig Preparation

1. Thoroughly clean the spray rig. Check for signs of rust, leaks or other problems.
2. Determine the gallons needed per acre based on the recommended rate from the pesticide label, tank size, pesticide container size, and rate of pesticide application per acre.

## Quick Facts

- Inaccurate pesticide application rates, spray patterns and droplet size can lead to the movement of pesticides from the targeted area and reduce pesticide effectiveness.
- The first step in sprayer calibration is to determine the correct nozzle type and size.
- Nozzle material is important in reducing inaccurate applications due to nozzle wear.

\*P.D. Ayers, Colorado State University Extension agricultural engineer and professor, chemical and bioresource engineering and B. Bosley, Morgan County Extension. Reviewed by D. Oatman, Extension agriculture agent, Las Animas County. 09/98

3. Calculate a rough estimate of nozzle application rates based on the planned application speed and boom pressure.
4. Check all nozzles on the spray boom for signs of wear and nozzle size. Replace worn nozzles and nozzles of the wrong size for the desired application.
5. Half-fill the spray tank with water and go to the prepared field.

### One Way to Calibrate a Sprayer

1. Measure the ground speed of the rig with the sprayer implement in place. (Average the travel time of the tractor in seconds over 300 feet in the field for two separate passes.)
2. Calculate the ground speed.
3. Measure the distance in inches between spray nozzles on the boom.
4. Calculate the desired nozzle output (ounces or gallons).
5. Catch one minute's worth of water from one or two nozzles at the operating pressure.
6. Adjust the pump pressure or ground speed until the desired output is reached.
7. Calculate the acreage covered on one tank of spray mixture.
8. Finish filling the spray tank with pesticide and carrier (usually water). Apply about one-half tankful of spray and determine if the correct amount of acreage has been covered.
9. Continue spray application; recalibrate if the first half tankful didn't cover the correct acreage.

### Example

The field is prepared and spray tanks, booms and nozzles have been cleaned and checked. The pesticide label recommends that 1 quart per acre of chemical and a minimum application of 10 gallons of mixture per acre be applied. The pesticide comes in 2 ½ gallon containers; the spray tank holds 350 gallons. Three hundred gallons can be applied before refilling.

In this situation, applying pesticide to 30 acres with one tankful would comply with the label. Solid-applied herbicides generally work better with larger volumes of spray mixture. One full container of chemical will cover 10 acres. If 15 gallons of carrier per acre are applied, the applicator would get 20 acres per refill and use two containers of pesticides.

The tractor with spray rig is set as if spraying the first 300-foot pass in 42.5 seconds. The second pass is a bit faster, at 42.7 seconds. The average time is 42.6 seconds.

$$\text{MPH} = 300 \text{ ft} / (1.47 \times 42.6 \text{ sec}) \\ = 4.8 \text{ MPH}$$

Spray nozzles are spaced at 30 inches. Using the formula acreage output rates to nozzle output, application will be about 0.364 gallons per minute per nozzle.

$$\text{GPM} = (15 \text{ GPA} \times 4.8 \text{ MPH} \times 30 \text{ inches}) \\ / 5940 = 0.364 \text{ GPM}$$

Experience shows that the pump can handle this volume and nozzles are rated for this application. Field application is now ready.

The nozzle output now can be checked at the field's edge. Once adjustments are made and each nozzle checks within 5 percent of the desired output, fill the tank with pesticide and water.

Ten acres should be covered by the time the half-tank level is reached using the example above.

A standard nozzle with a flow rate of 0.4 gallons per minute at 40 psi is easy to obtain. The 15-gallon per acre application rate can be obtained by operating the sprayer at the recommended 40 psi and a higher ground speed.

$$\text{MPH} = (\text{GPM} \times 5940) / (\text{GPA} \times \text{w}) \\ = (0.4 \text{ GPM} \times 5940) / (15 \text{ GPA} \times 30 \text{ in}) \\ = 5.3 \text{ MPH}$$

Or the ground speed can be kept constant at 4.8 miles per hour, and the nozzle pressure reduced using the following relationship.

$$\text{Pressure new} / \text{pressure rated} = \\ (\text{GPM desired} / \text{GPM rated})^2 = \\ \text{Pressure new} / 40 \text{ psi} = \\ (.364 \text{ GPM} / .4 \text{ GPM})^2$$

The new pressure is 33 psi. Use small adjustments in pressure to obtain the desired nozzle flow rate within the recommended operating pressure. Operating a nozzle at excessively high pressures will produce small spray droplets susceptible to drift. Operating at excessively low pressures produces larger, less-effective spray droplets and poor spray pattern uniformity down the length of the boom.

If calibrating with water and spraying solutions that are heavier or lighter than

**Table 1: Spraying solution conversion factors.**

Weight of solution (per gallon)	Specific gravity	Conversion factors
7.0 lbs	.84	.92
8.0 lbs	.96	.98
8.3 lbs*	1.00	1.00
9.0 lbs	1.08	1.04
10.0 lbs	1.20	1.10
11.0 lbs	1.32	1.15
12.0 lbs	1.44	1.20
14.0 lbs	1.68	1.30

\*Suitable for most water-soluble pesticides.

water (8.3 pounds per gallon), use the conversion factors in Table 1.

In the above example, to obtain a nozzle flow rate of 0.364 GPM with a solution that weighs 10 pounds per gallon, the nozzle should produce 0.364 GPM x 1.10 or about 0.40 GPM when spraying water.

### Spray System Checks

After all the adjustments are made, fill the sprayer with water and measure the nozzle flow rates by catching the nozzle output for 1 minute. Divide the number of ounces by 128 (128 ounces in a gallon) to obtain the flow rate in gallons per minute. For example, 67 ounces caught in 1 minute produces a flow rate of 67/128 or 0.52 GPM. Another method of measuring nozzle flow rates is with a spray tip tester. Maintaining the desired application rate is essential. Over-application results in wasted pesticide, potential groundwater contamination, and possible crop injury. Under-application can produce ineffective pest control.

Erroneous flow rates can result from damaged, worn or plugged nozzles or strainers, and spray hose restrictions between the pressure gauge and the nozzle. Clean nozzles with a toothbrush, not a pocket knife. Never blow out a nozzle with the mouth.

Check the pressure along the length of the boom. If a large pressure difference is found, look for restrictions or install a larger diameter spray hose (see Table 2). An accurate pressure gauge is worth the extra cost.

**Table 2: Pressure drop through various hose sizes.**

Flow in GPM	Pressure drop in PSI (in 10-foot length) without couplings				
	1/4" I.D.	3/8" I.D.	1/2" I.D.	3/4" I.D.	1" I.D.
0.5	1.4	.2			
1.0		.7			
1.5		1.4	.4		
2.0		2.4	.6		
2.5		3.4	.9		
3.0			1.2		
4.0			2.0		
5.0			2.9	.4	
6.0			4.0	.6	
8.0				.9	.3
10.0				1.4	.4

### Field Checking

Conduct field calibration when spraying the pesticide. Start with the tank full of solution, spray a known distance in the field (at least 3,000 feet) and determine the number of gallons needed to refill the tank. Determine the application rate (GPA) with the following formula.

$$\text{GPA} = (\text{gallons sprayed} \times 43,560) / (\text{Boom width (ft.)} \times \text{distance (ft.)})$$

### Spray Distribution Uniformity

Spray distribution uniformity is important for broadcast spraying. Uniform spray coverage eliminates weed streaking and crop injury. Concentrations up to four times the recommended amount can result from non-uniform applications. To obtain even coverage, make sure all the nozzles are the same and are equally spaced along the boom. Check each nozzle to make sure the flow rates are correct. Replace nozzles if the flow rates are 10 percent or more in

error. The boom height should be adjusted to the recommended height (Table 3). Spray boom bounce should be minimized with support members.

**Table 3: Nozzle height (inches) for flat-fan nozzles.**

Spray angle (degree)	20-inch spacing	30-inch spacing
65	21-23	32-34
73	20-21	27-29
80	17-19	25-27
110	10-12	14-18

Check spray uniformity by spraying water on a concrete surface and observing the amount of streaking that occurs when the water dries. Spray patterns that result in excessive accumulation below the nozzle are produced by:

1. nozzle wear,
2. low boom height,
3. low operating pressure, and
4. large nozzle spacing.

Irregular spray patterns result from damaged nozzle tips, mismatched nozzles and uneven booms.

Pesticide drift is a major concern. In addition to reducing effectiveness, pesticide drift can damage non-target areas. One method to decrease drift is to use a low volatile formulation that is less likely to volatilize and drift.

Pesticide drift also can be controlled by reducing the number of small droplets emitted from the sprayer. Nozzle type, angle and orientation, boom height, and operating pressure can influence the production of driftable drops. A droplet of 100 microns in diameter can drift about 50 feet in a 3 mph breeze; a 10- micron droplet can drift 3,000 feet. Spray thickeners can reduce drift, as can spraying at low temperatures and high humidity.

### Useful Formulas and Equivalents

1 acre = 43,560 square feet

1 gallon = 128 fluid ounces

1 pint = 16 fluid ounces

1 pound = 16 ounces of weight (16 fluid ounces of water at 39 degrees Fahrenheit weighs 1 pound)

Gallons per acre = (5,940 x gallons/minute/nozzle) / (MPH x nozzle spacing)

Gallons per minute per nozzle = (gallons/acre x MPH x nozzle spacing) / 5,940

Ounces per minute per nozzle = (gallons/acre x MPH x nozzle spacing x 32) / 1,485

Miles per hour = distance travelled (ft) / (88 x minutes) = distance travelled (ft) / (.47 x seconds)

# EXHIBIT 2

**From:** Dawson Morton [<mailto:dawson@gafr.org>]  
**Sent:** Thursday, July 16, 2015 10:19 AM  
**To:** Hall, Nancy  
**Subject:** Plantation Sweets

Hi Ms. Hall:

I just wanted to confirm again that our client one of the worker's sprayed can speak to an investigator if provision for translation is made. When we spoke last week you said that the Department did not have any spanish-speaking investigators or any means of translation, if that changes please let me know.

Dawson

—

Dawson Morton  
Georgia Legal Services, Farmworker Rights Div.  
404-463-1633



From: Bill, New York, NY  
Date: Mon, 20 Dec 2011 11:47 AM  
Subject: [REDACTED]  
To: [REDACTED]

Hi [REDACTED]

[REDACTED]

# EXHIBIT 3

[REDACTED]

[REDACTED]

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