

<i>Title:</i> TOS Standard Operating Procedure (SOP): Toxicodendron Biomass and Handling		<i>Date:</i> 01/31/2017
<i>NEON Doc. #:</i> NEON.DOC.001716	<i>Author:</i> Courtney Meier	<i>Revision:</i> B

TOS STANDARD OPERATING PROCEDURE (SOP): Toxicodendron Biomass and Handling

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Change Record

REVISION	DATE	ECO #	DESCRIPTION OF CHANGE
A	05/20/2016	ECO-03834	Initial release
B	MM/DD/2016	ECO-4395	Added equipment and guidance to avoid exposure based on ongoing Field Ops experience with <i>Toxicodendron</i>

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1 DESCRIPTION

1.1 Purpose

This Standard Operating Procedure provides techniques specific to handling *Toxicodendron* species. This SOP is only required at sites where technicians will be exposed to *Toxicodendron* species.

1.2 Scope

This document provides a change-controlled version of an Observatory procedure. Documentation of content changes (i.e. changes in particular tasks or safety practices) will occur via this change-controlled document, not through field manuals or training materials.

1.3 Applies To

The procedure described in this document is applicable while sampling with the following protocols:

Doc #	Title
NEON.DOC.000481	TOS Protocol and Procedure: Small Mammal Sampling
NEON.DOC. 000987	TOS Protocol and Procedure: Measurement of Vegetation Structure
NEON.DOC.001710	TOS Protocol and Procedure: Litterfall and Fine Woody Debris
NEON.DOC. 014037	TOS Protocol and Procedure: Measurement of Herbaceous Biomass
NEON.DOC. 014038	TOS Protocol and Procedure: Core Sampling for Plant Belowground Biomass
NEON.DOC.014042	TOS Protocol and Procedure: Plant Diversity Sampling
NEON.DOC.014050	TOS Protocol and Procedure: Ground Beetle Sampling

1.4 Acknowledgments

2 RELATED DOCUMENTS AND ACRONYMS

2.1 Applicable Documents

Applicable documents contain higher-level information that is implemented in the current document. Examples include designs, plans, or standards.

AD[01]	NEON.DOC.004300	EHSS Policy, Program and Management Plan
AD[02]	NEON.DOC.004316	Operations Field Safety and Security Plan
AD[03]	NEON.DOC.050005	Field Operations Job Instruction Training Plan

2.2 Reference Documents

Reference documents contain information that supports or complements the current document. Examples include related protocols, datasheets, or general-information references.

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RD[01]	NEON.DOC.000008	NEON Acronym List
RD[02]	NEON.DOC.000243	NEON Glossary of Terms
RD[03]	NEON.DOC.005003	NEON Scientific Data Products Catalog
RD[04]	NEON.DOC.000987	NEON Protocol and Procedure: Measurement of Vegetation Structure
RD[05]	NEON.DOC.014037	NEON Protocol and Procedure: Measurement of Herbaceous Biomass
RD[06]	NEON.DOC.014038	NEON Protocol and Procedure: Core Sampling for Belowground Biomass
RD[07]	NEON.DOC.001710	NEON Protocol and Procedure: Litterfall and Fine Woody Debris

2.3 Acronyms

All acronyms used in this document are defined in RD[01].

2.4 Definitions

3 SAFETY

This document identifies procedure-specific safety hazards and associated safety requirements. It does not describe general safety practices or site-specific safety practices.

Personnel working at a NEON site must be compliant with safe field work practices as outlined in the Operations Field Safety and Security Plan (AD[02]) and EHSS Policy, Program and Management Plan (AD[01]). Additional safety issues associated with this field procedure are outlined below. The Field Operations Manager and the Lead Field Technician have primary authority to stop work activities based on unsafe field conditions; however, all employees have the responsibility and right to stop their work in unsafe conditions.

3.1 Toxicodendron Safety

Safety considerations for handling *Toxicodendron* species include:

1. Use pre-contact solutions on exposed skin when going into areas known to contain *Toxicodendron* (e.g., IvyX Pre-Contact solution).
 -) Follow manufacturer’s instructions, and
 -) Check with experienced field staff to ensure the product is being used as effectively as possible.
2. Avoid direct skin contact with *Toxicodendron* leaves, stems, and roots. Wear long sleeves, long pants, boots, cotton gloves, safety glasses, and outerwear coveralls (Personal Protective Equipment; PPE).
 -) Oils can penetrate through thin layers, especially those made of nylon, polyester, or other moisture wicking fabric. Heavy cotton is most resistant to penetration by urushiol.

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-) Wearing knee pads reduces exposure to the knees if prolonged periods of kneeling in and around crushed *Toxicodendron* is required.
 -) If access to a washer/dryer is available, coveralls may be cotton and can be washed and re-used
 -) If a washer/dryer is unavailable, disposable coveralls may be used (e.g., disposable suit used for painting, etc.).
 - Note that thicker cotton that can be washed has been found to be more effective than this option.
- 3. Wash clothes immediately after contact with *Toxicodendron* species to prevent additional exposure. Wipe down boots with rubbing alcohol.
 -) **Very important:** If someone else may handle the laundry, make sure they are aware of the potential oil contaminant.
- 4. Never burn plants that may be *Toxicodendrons*. Inhaling smoke from burning plants can cause severe allergic respiratory problems.
- 5. In the field, technicians who have come in contact with *Toxicodendron* species should immediately apply Tecnu® to the affected area (or equivalent), similar to the manner in which a liquid soap or lotion is applied, then rinse it off.
 -) If water is limited, wipe off Tecnu with a rag or paper towels.
 -) Rinsing with cold water is crucial because pores open in response to warm water, and thus warm water can increase penetration of toxic oils into the skin.
 -) Liquid dish soap may be used for a thorough cleaning upon return from the field.
- 6. Be aware that incidental contact between contaminated clothing and gear, vehicles, door knobs, etc. can cause the spread of toxic oils to others.
 -) **Important:** When working with *Toxicodendron*, be aware of your exposure status and what you are touching at all times.
- 7. If an allergic reaction develops, an anti-histamine can be taken to help relieve itching.
 -) Technicians should seek medical attention in the case of severe allergic reactions, or if there is a history of severe reactions.

3.2 Equipment

The following equipment is needed to implement the procedures in this document. Equipment lists are organized by task. They do not include standard field and laboratory supplies such as charging stations, first aid kits, drying ovens, ultra-low refrigerators, etc.

Table 1. Equipment list required for *Toxicodendron* handling across all protocols.

Item No.	R/S	Description	Purpose	Conditions Used	Qty	Special Handling
Consumable items						
	R	Pre-contact solution, IvyX pre-contact or equivalent	Protect exposed skin that cannot be covered with gloves or other PPE	All	As needed	N
MX107108	R	Cleanser, urushiol-specific, Tecnu, Ivy-X, or equivalent	Clean equipment after use with <i>Toxicodendrons</i>	All	As needed	N
	R	Cotton gloves, single use	Prevent oil contact with skin	All	Box of 12	N
	R	PPE outer-wear coveralls, cotton or other material	Prevent oil contact with skin, normal clothing	Severe reactions	As needed	N
	R	Trash bag	Dispose of used gloves and PPE to minimize toxic oil transfer	All	Box	N
	S	Knee pads	Prevent oil contact through PPE when kneeling on crushed <i>Toxicodendron</i> leaves and stems	Severe reactions	Pair	N

R/S=Required/Suggested

3.3 Training Requirements

All technicians must complete procedure-specific training for safety and implementation of this procedure as required in Field Operations Job Instruction Training Plan (AD[03]).

Work with experienced field staff to ensure that safety measures for mitigating exposure to and spreading of toxic oils are carried out effectively. Training will make all of the preventative measures described in this SOP more effective (e.g., application of pre- and post-contact solution, preventing accidental spread via clothing and vehicles, etc.)

3.4 Specialized Skills

All technicians must be able to identify regionally-specific *Toxicodendron* species by sight.

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4 CONTINGENCIES AND NOTES

Not applicable.

5 STANDARD OPERATING PROCEDURES

SOP A Preparing for the Field

Pack equipment required for safe handling in field supplies (see

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A.1 Table 1)

Make sure all field technicians are able to identify *Toxicodendron* species by site. See AD[02] for a guide of common *Toxicodendron* species.

1. Pre-weigh and label each envelope or bag that will be used for storing and drying *Toxicodendron* biomass.
2. Once the weight of each empty envelope or bag is written on the envelope or bag label, the biomass inside the bag will never be touched after it is initially placed in the bag.

A.2 Handling *Toxicodendron* biomass in the field

1. Wear cotton gloves and dispose or launder after single use. Toxic oils can pass through nitrile or latex gloves.
2. Wear an outer layer of cotton or disposable PPE over clothing (and optionally over shoes).
 -) People who repeated kneel on crushed *Toxicodendron* during plant biomass clipping may react to *Toxicodendron* oils on the knees despite wearing PPE.
 -) Wearing knee pads greatly reduces the chance of developing a reaction on the knees.
3. Bring a clean, new plastic bag to the field for storing and transporting contaminated gloves, PPE, and contaminated equipment after use.

A.3 Collecting *Toxicodendron* biomass in the field

1. Use a pair of labeled clippers dedicated solely to clipping *Toxicodendron* species and clean with Technu® (or equivalent) after each use. Store separately from other clippers to prevent accidental contact.
2. Use clippers to remove and minimize contact with *Toxicodendron* biomass that is not being measured or collected.
 -) Crushing and chipping stems and roots releases relatively large quantities of toxic oil (urushiol).
 -) Be very careful and avoid contact with oils and fluids weeping from cut or crushed stems and roots; people who do not react to leaf exposure often react to exposure via this route.

A.4 Cleaning contaminated equipment and clothing

Contamination of equipment, clothing, vehicles (steering wheels, doors, handles, seat covers, etc.), and gear is a common mechanism of exposure to poisonous *Toxicodendron* oils. Anything exposed to oils in the field can become a source of exposure if the item is not cleaned properly before it is used again by another person.

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-) *Example:* A technician developed a *Toxicodendron* rash on the backs of the legs after sitting on a couch in a pair of shorts, after other technicians sat on the same couch without first changing out of field clothing exposed to *Toxicodendron* oils.
-) *Example:* A technician developed a rash on the neck from a compass lanyard that another technician had previously used while sampling *Toxicodendron*.
-) *Example:* A technician contaminated an entire vehicle after being unaware how to properly ID a *Toxicodendron* species.

Given these examples, it is best practice to separate lab equipment that has been exposed to *Toxicodendron* oils from equipment that is oil free, and to make sure all staff are aware of which equipment is potentially contaminated. If this is not feasible, ***thorough cleaning of equipment and clothing is absolutely critical to prevent your colleagues from being exposed to toxic oils.***

1. Clean all equipment that comes into contact with *Toxicodendron* species with Technu® or equivalent. Store separately from other equipment to prevent accidental contact. This includes:
 -) Tapes
 -) Compasses
 -) Coolers
 -) Vehicles
 -) Hori-hori knives
 -) Plot frames
2. Hard surfaces within vehicles should be wiped down with Tecnu, and great care should be taken not to expose vehicle upholstery to toxic oils.
 -) A natural citrus degreaser has also been shown to be effective for wiping down hard surfaces.
3. Wear gloves while handling unwashed clothing exposed to toxic oils.

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4. Wash contaminated clothing with ordinary laundry detergent at the highest recommended water temperature.



-) Do NOT re-wear field clothes that have been contaminated with *Toxicodendron* oils. Always wash after one day's use in the field.
-) Never put unwashed field clothes into the dryer; always wash first.
-) Do not overload the machine; the clothes must be allowed to agitate freely. For reference: <http://laundry.about.com/od/removeoutdoorstains/a/poisonivylaundry.htm>

6 REFERENCES

Not applicable