

# ***24" Soil Sampling Equipment & Sample Quality***

## ***Soil Probes, Tips and Tricks (Cheats)***



# *Frustrated with “Poor Quality” soil cores?*

Why is this  
happening to  
**ME!!!**



# ***Sampling Wet Soil***

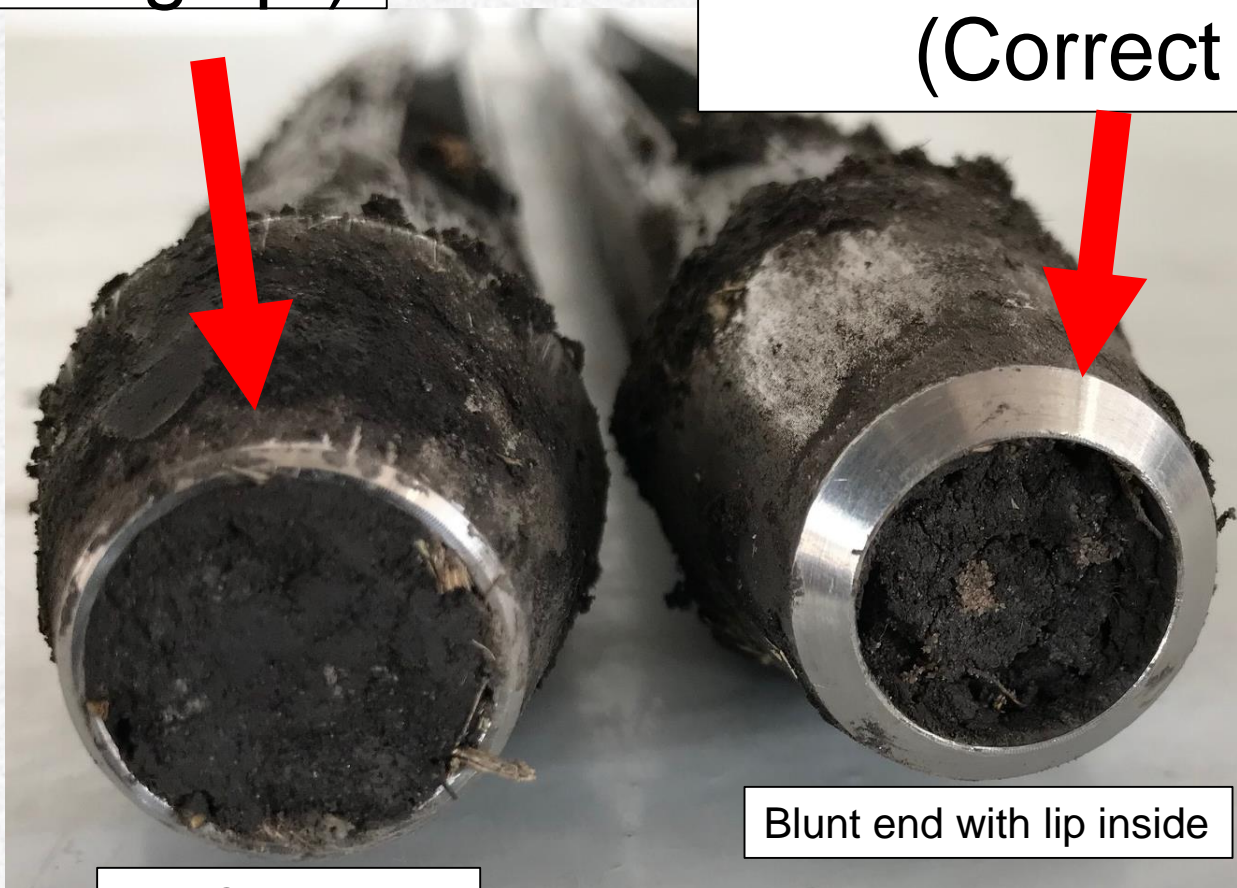
## ***What can go wrong?***

- Tip plugged
- Plugged probe due to build up inside probe
- Core pulls out the bottom of probe (rat tail)
- Compression of soil core in probe (this is OK)

# ***Wet Sticky Soil Conditions***

Plugged  
Dry Tip  
(wrong tip!)

Wet tip with recessed  
Lip - Not plugged  
(Correct tip)



Thin Cutting Edge

Blunt end with lip inside



# *Dry Cutting Tip vs Wet Tips*

Wet tip - Lip inside tip prevents most plugging in wet stick soils

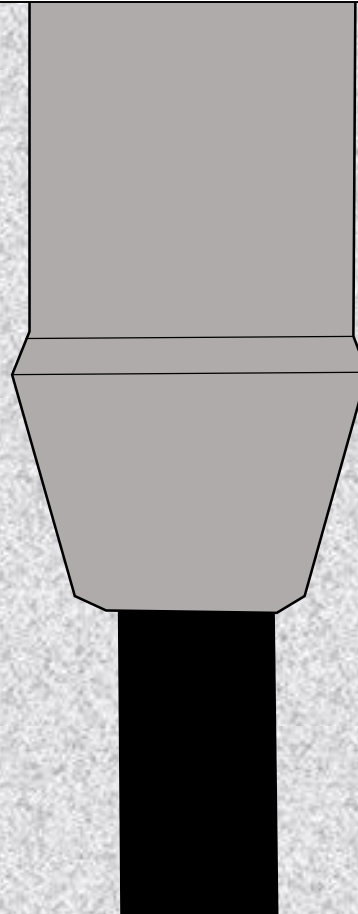


Dry Tip - Sharp cutting edge and slow taper prevent soil core from falling out in dry conditions

# *Rat Tail (core pulls out!)*

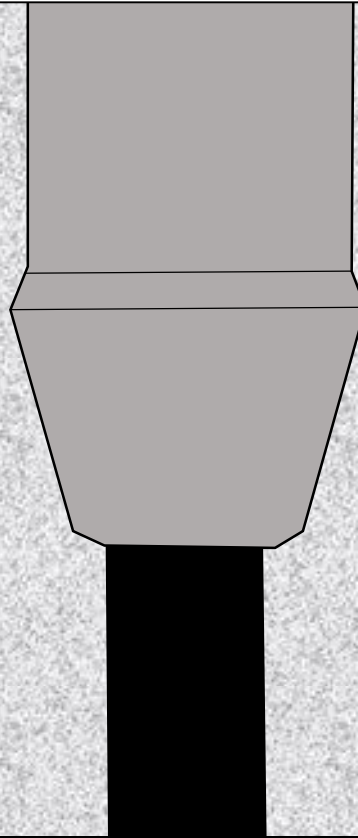


***Preventing “Rat Tail” in wet Soil Conditions.  
Soil core does not break off and pulls out***





- Solution: Extend probe to 24" depth, raise it up a 2" and then extend the probe to 24" again.
- This action will break the core loose so it will stay in the probe and not pull out





# Soil Sampling Lubricants

*University of Wyoming 1995 (WD-40 Recommended)*

Lubricant	Nitrate Lb/a	P ppm	K ppm	Fe ppm	Mn Ppm	Zn ppm	Cu ppm
Control	14	11	218	15.0	1.5	0.8	1.1
PAM	16	11	227	14.6	4.0	0.8	1.1
Silicone	12	10	219	14.2	1.5	0.8	1.1
<b>WD-40</b>	<b>14</b>	<b>10</b>	<b>221</b>	<b>13.9</b>	<b>1.6</b>	<b>0.8</b>	<b>1.0</b>
LSD .05	ns	ns	ns	ns	ns	ns	ns

*AGVISE will be doing a research project on WD-40*

# *Why WD-40?*

- Testing shows no contaminants
- Very good proven lubrication
- Evaporates away quickly (others linger and remain sticky on the probe)
- High carbon chain does not encourage microbial activity



# ***Sampling Dry Soil***

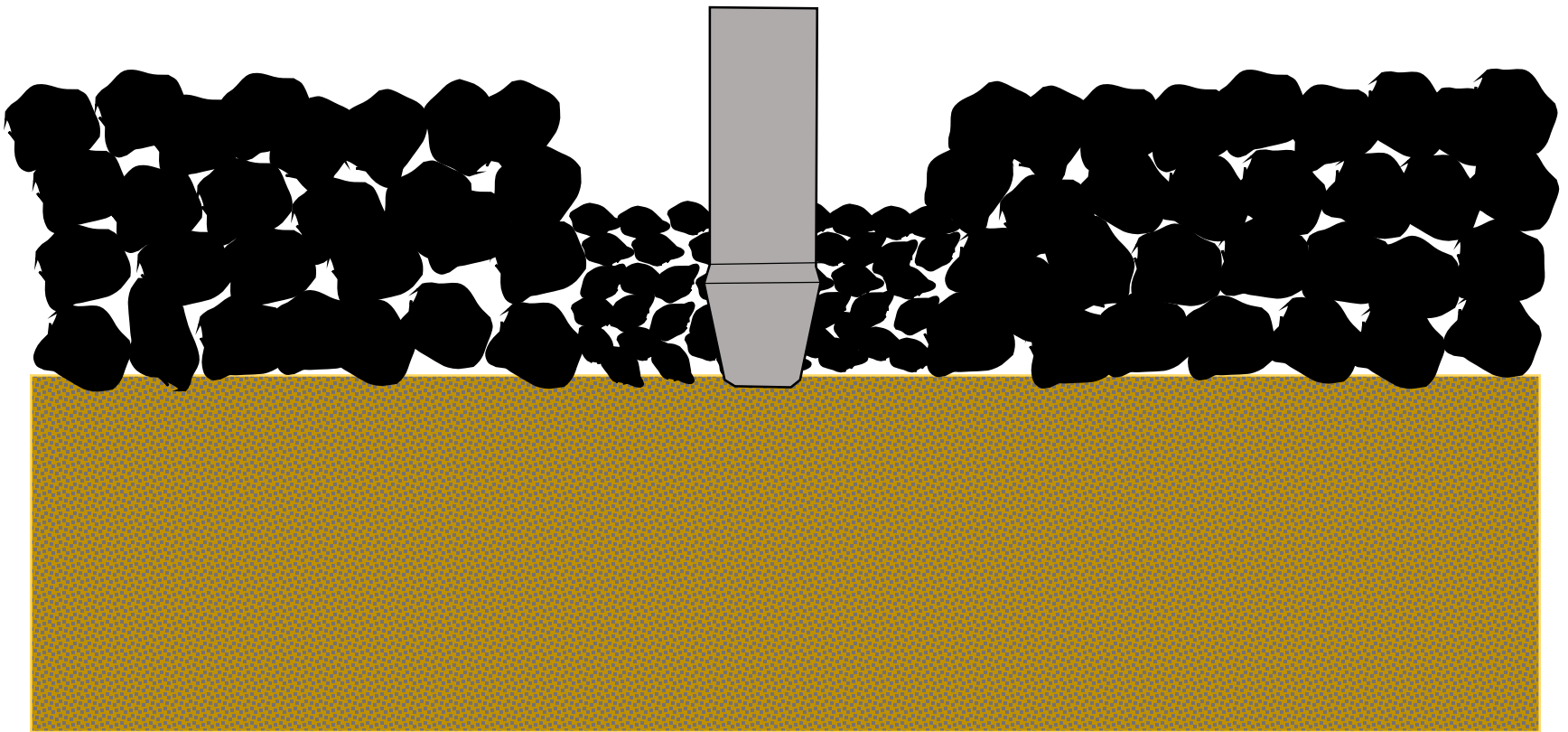
## ***What can go wrong?***

- Powdery dry topsoil falls to bottom of probe (lower P soil test results)
- Dry soil falls out the bottom of the probe (empty probe Grrrrrrrrr”)
- Hard dry clods prevent soil from coming into probe tip (can miss some topsoil)
- Not enough weight to push probe 24” into soil Lifts truck! (receiver mounted)



# ***Tilled Soil - Sample in Wheel Track!***

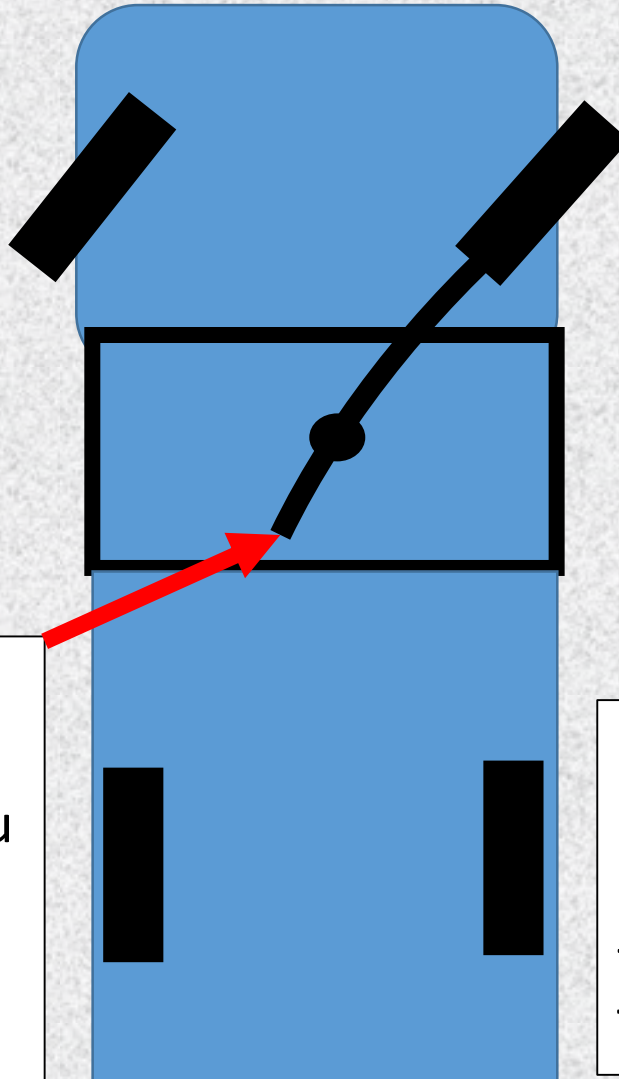
- Clods of soil tend to plug tip or be pushed away
- Compressed/dense soil cuts better – less plugging
- Get a better more consistent slice of soil profile
- Tend to get better P soil data from wheel track



# *Sampling from Wheel Track*

Cab mounted  
Cylinder

Wheel track will be visible through the hole in the floor as you turn to the right. Take core from center of wheel track.



It is important to mount cylinder close enough to driver so he can see down the hole and see wheel Track.

# ***What is a “Good” soil core?***

- Compression happens to soil core inside the tube
  - Soil core can be compressed when air is squeezed out and core ends up shorter than 24”.(moisture dependent)
  - More compression when soil has moderate moisture
  - No compression when frozen, saturated or very dry
  - Soil cores longer than 18” are good quality and should be submitted as 24” cores (slotted probe so you see core)
  - Compression of core by 25% is OK as long as probe tip is not plugged
  - Tip is plugged! **Throw the core away** and try other tips and add lubricant if wet soil.
  - Automated systems do not allow “bad” cores to be thrown away!

# ***Wet Loam/Clay***

- Wet soil conditions
  - Need “wet” tip with recessed lip
  - larger tip opening is better
  - WD-40 lubricant is required
- Recommended probe and tip
  - HD Probe with “wet” tip (best)
  - Stainless probe with “wet” tip (OK)



# “Wet” Clay Loam *Tube and Tip* *Performance*

HD Probe and “Wet” tip  
Most consistent  
Easier to get core out!!

WD-40 is required  
on wet sticky soils



# *Dry Loam/Clay*

- DRY soil conditions (loam or clay)
  - larger cutting tips are OK (>5/8")
  - Sometimes recessed lip works too
- Recommended probe and tip
  - HD Probe with "dry/wet" tip
  - Stainless probe with "dry/wet" tip

Even in dry conditions, HD wet tip may work OK on heavy clay soils!

# **“DRY” Clay Loam Tube and Tip Performance**

## **Combinations that did OK**

HD Probe “Wet” tip

Stainless 5/8” cutting tip

Stainless 3/4” cutting tip

HD Probe “Dry” tip



# *Dry Sandy Soil*

- Dry soil conditions (sandy soils)
  - Cutting tip (sharp edge)
  - Larger tip opening is better ( $>5/8$ " )
- Recommended probe and tip
  - HD Probe with new "Dry" tip
  - Stainless probe with  $3/4$ " tip



# “Dry ” Sandy Loam **Tube and Tip** **Performance**

HD Probe and “DRY” tip  
Most consistent

Stainless Steel probe with  
3/4” cutting tip worked  
pretty well too!



# ***Stainless Steel Probe Tips***

## ***What you need!***

- **Stainless Steel Probe Body**

- Stainless Steel – 7/8" inside diameter (smaller than HD)
- Probe tips
  - **Cutting tips**
    - Stainless Steel 1/2" (not recommended), 5/8" and 3/4"
  - **Wet tip**
    - Recessed lip with 5/8" opening



# ***HD Probe Tips (need both)***

- **HD (Chromoly Steel) Probe Body**
  - HD Chromoly Steel – 1 1/16” inside (very hard)
  - Frozen ground sampling
- **HD Probe tips**
  - **Cutting tip** (New for dry sandy soils) 3/4” opening
  - **Wet tip** (for sticky wet soil or frozen soil) need lip



# ***HD “Dry” Tip New in 2018***

Many good comments from customers in dry areas. highly recommend

**HD “Dry” tip  
Included in  
all sampling  
Systems now!**





# *AGVISE Demonstration Truck (come and see it all work!)*

- 24" electric/hydraulic (receiver)
- 42" Electric/hydraulic (receiver)
- 42" Honda motor powered system  
Telescoping cylinder (in cab)

# *AGVISE Demonstration Truck*



***24" and 42" sampling systems installed in receiver hitch and telescoping cylinder in cab for viewing and testing***





# ***Best probe and tip changes as soil texture and moisture change!***



You need both stainless and HD probes and dry and wet tips for all situations



# Perfect in-Cab Sampling System

Warm or cool cab, for  
efficient Sampling 😊

Soil Core  
Containers  
handy

PVC pipe for  
(WD-40)  
for wet soils

Slotted probe and right  
tips for all conditions

Control box  
(handy location)



A vibrant sunset scene with a white rectangular text box at the top. The sky is filled with orange and yellow clouds, and the sun is low on the horizon behind a line of dark trees. The foreground is a dark, calm body of water.

***Thank You  
Questions?***

***CEU sign out!  
Ideas for topics and Speakers  
Travel Safe!***