



**BOREAL**  
GENOMICS

# Boreal Aurora

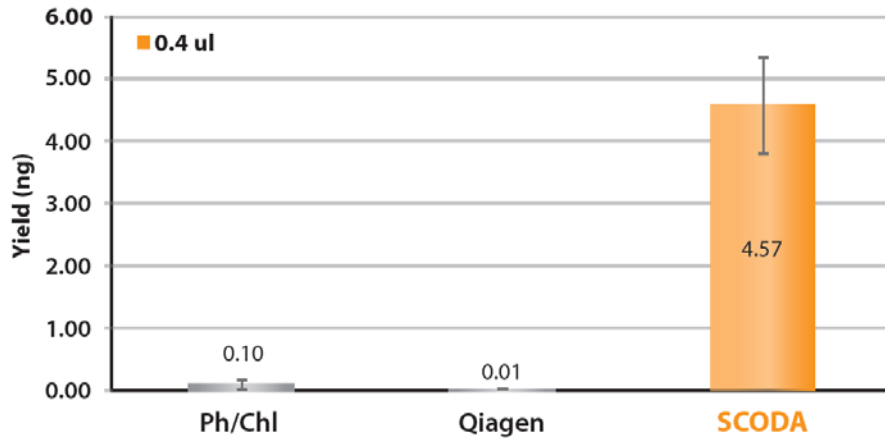
- 1 x 5mL or 4 x 1 mL input
- Output in 15 – 60 uL
- Unattended operation
- Lysate to DNA/RNA in one step



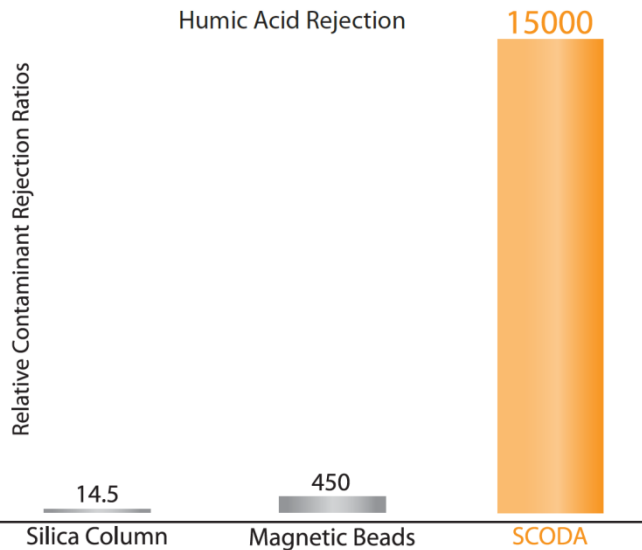
Aurora can rescue your most difficult samples, by delivering exceptional **yield** and **purity**



# Performance



Over 100X improvement  
in **yield** for dilute  
samples



Up to 1000X improvement  
in **purity** over columns

J.Pel et al. *PNAS* 2009



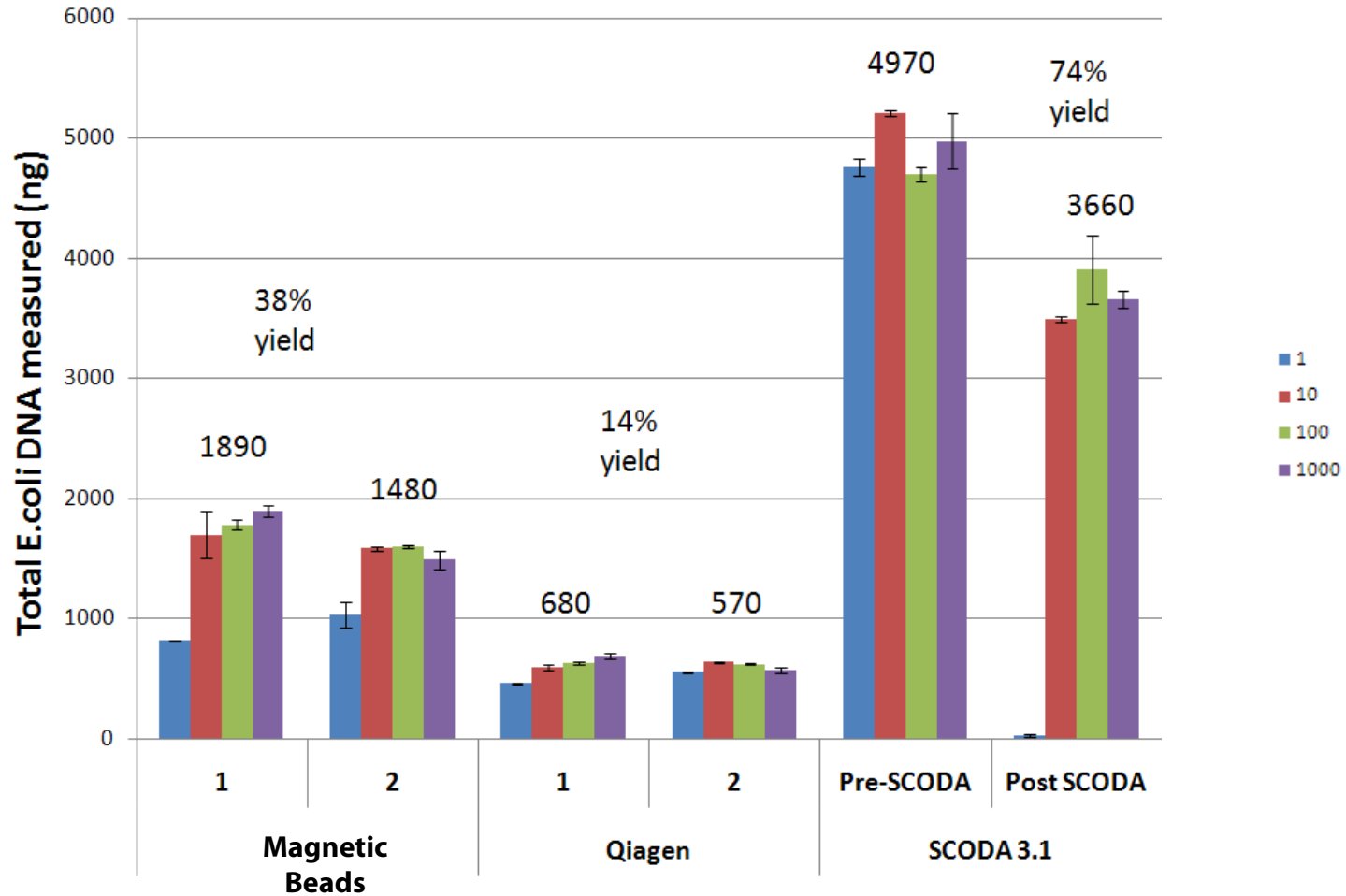
# Protein removal

|                | Initial Protein Concentration (ug/mL) | Final Protein Concentration (ug/mL) | Protein Rejection Ratio |
|----------------|---------------------------------------|-------------------------------------|-------------------------|
| <b>Qiagen:</b> |                                       |                                     |                         |
| Control        | 270 +/- 83                            | 3.9 +/- 2.8                         | 69                      |
| Spiked         | 9300 +/- 480                          | 190 +/- 57                          | 49                      |
| <b>SCODA:</b>  |                                       |                                     |                         |
| Control        | 1400 +/- 95                           | 0.3 +/- 0.5                         | 4700                    |
| Spiked         | 13000 +/- 700                         | 3.8 +/- 5.0                         | 3400                    |

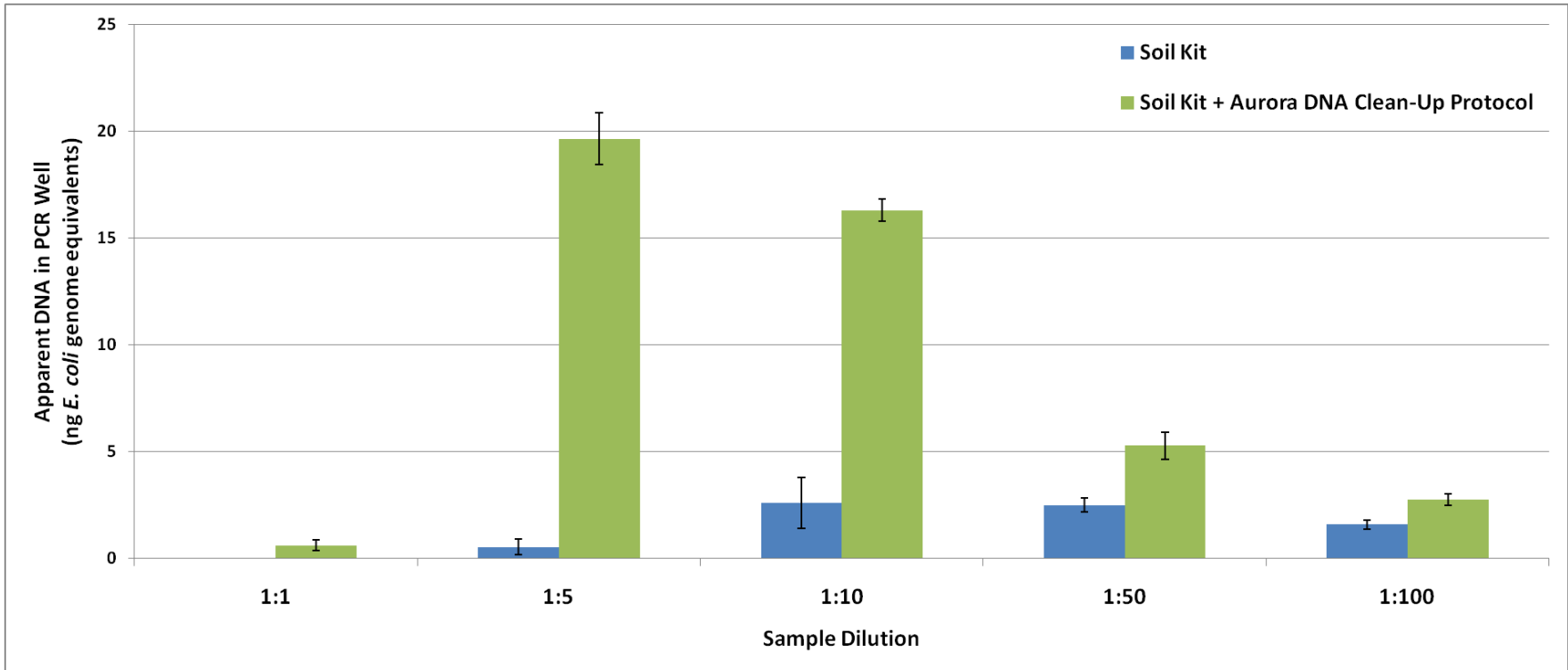
Protein rejection from *E. coli* lysate



# *E. coli* from whole blood



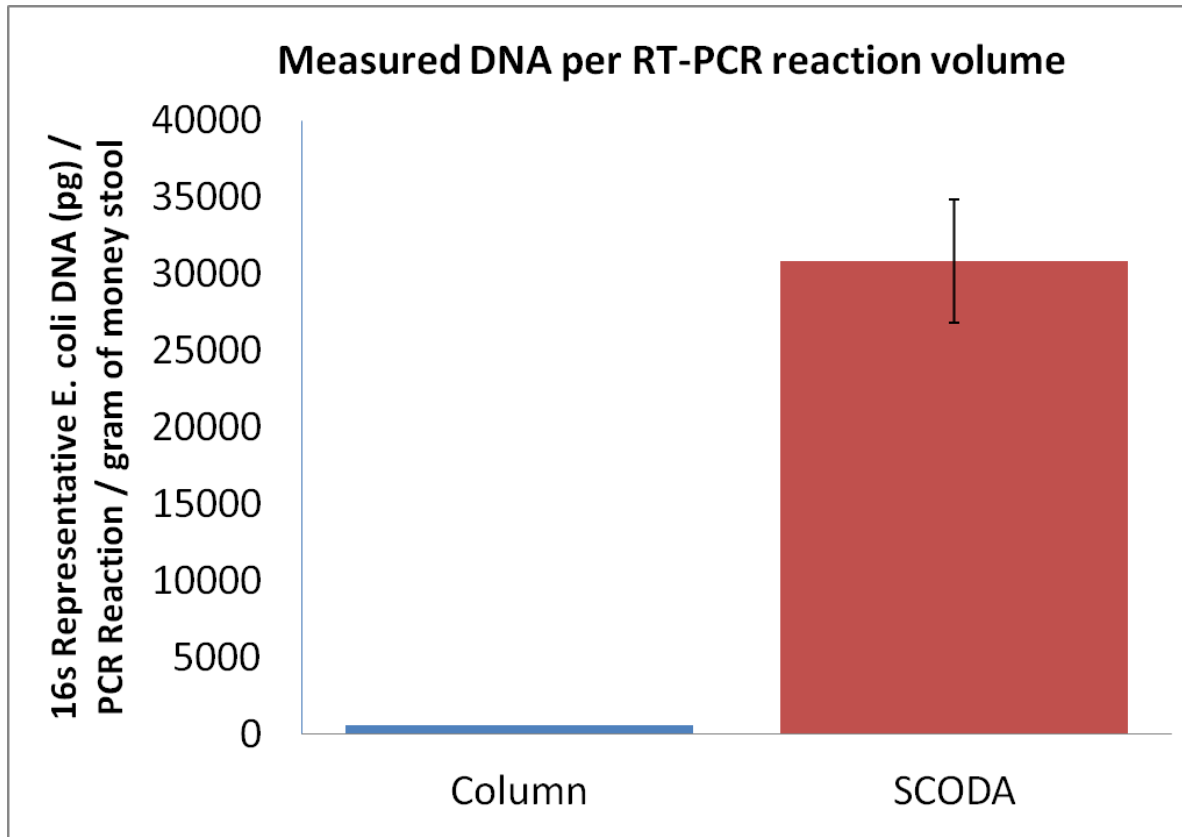
# Post-column cleanup: Soil



SCODA can **re-concentrate** DNA without co-concentrating contaminants, improving DNA/inhibitor ratio in PCR



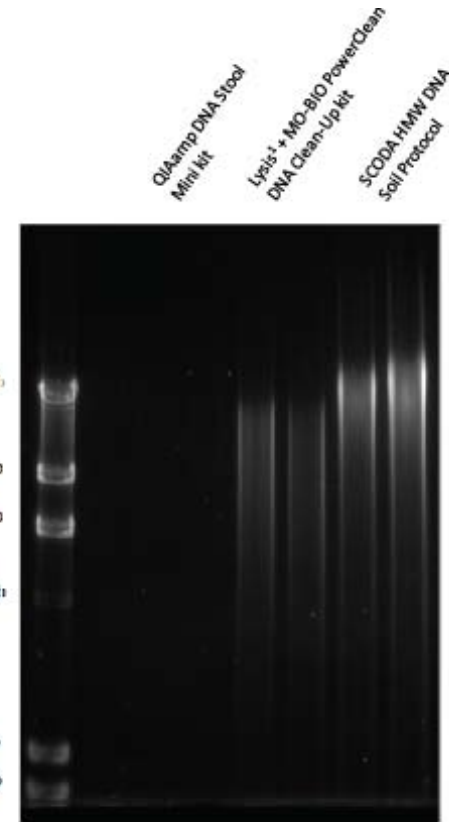
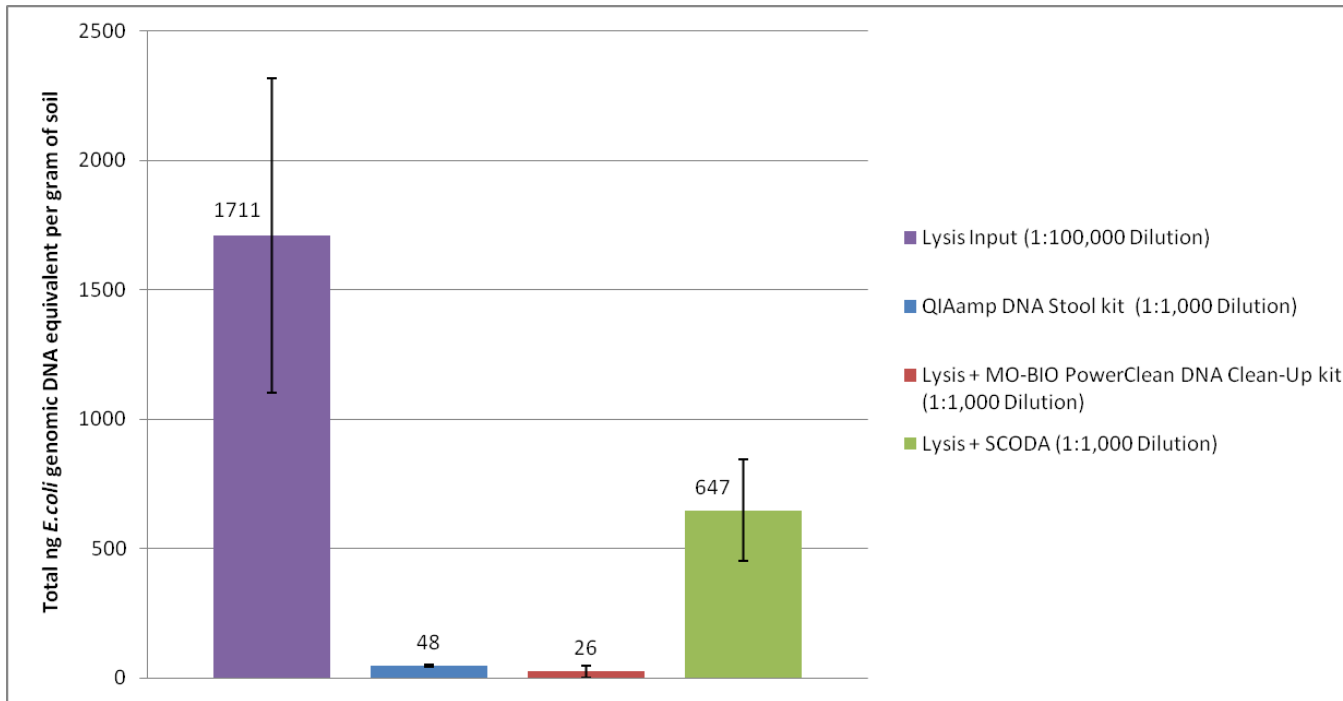
# Post-column cleanup: Stool



SCODA can **re-concentrate** DNA without co-concentrating contaminants, improving DNA/inhibitor ratio in PCR



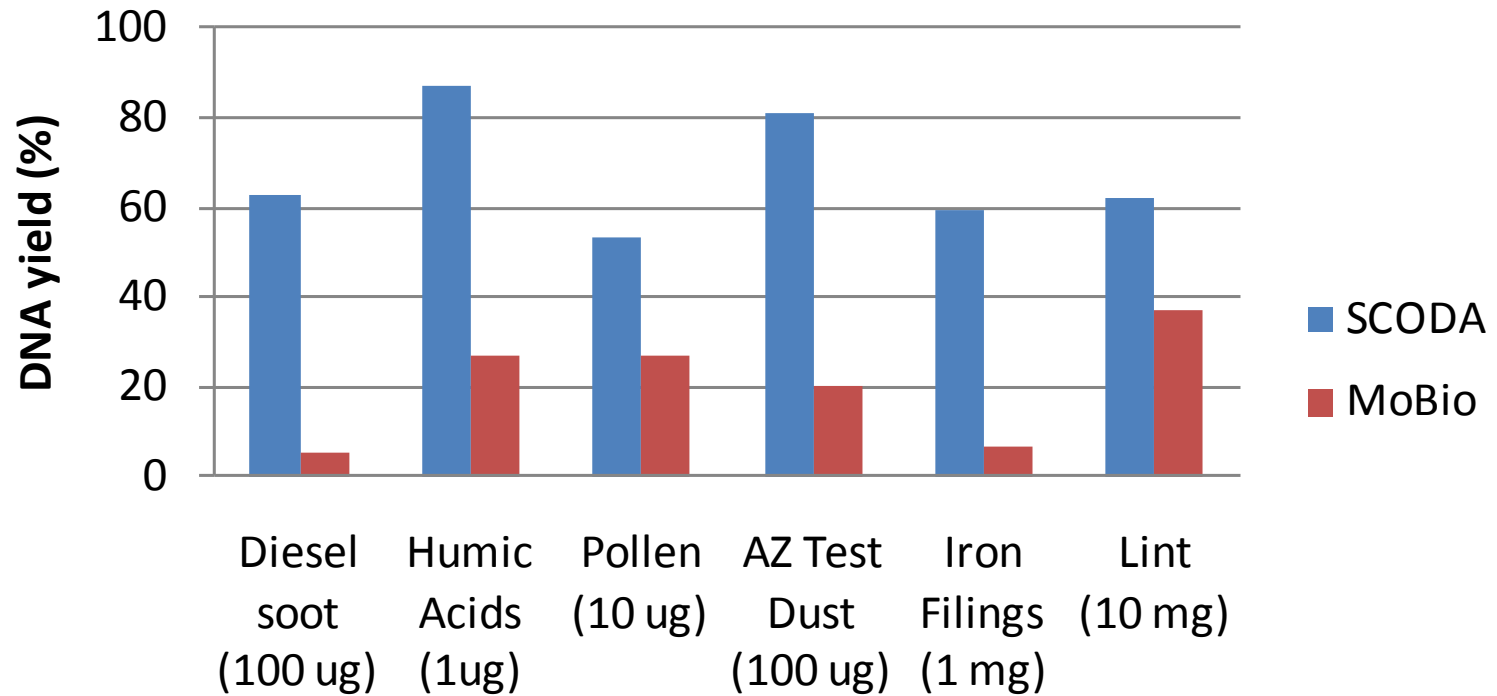
# HMW DNA direct extraction from soil



SCODA delivers much **greater yield** from soil



## DNA yield in presence of interferents



SCODA rejects a broad range of contaminants



# Demonstrated Examples

## Forensics:

- Extraction of DNA from “difficult” forensic samples
- Produced STR profiles from all samples analyzed, including blood on denim and soil.



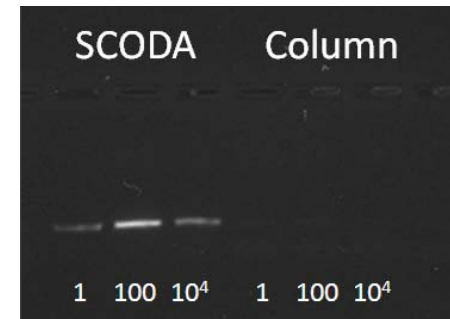
## Genomics:

- Extraction of DNA from Athabasca Tar Sands
- Recovered 1 ug of clean DNA from 150mL of tar sands – discovered 200 new organisms
- All other methods failed in extraction

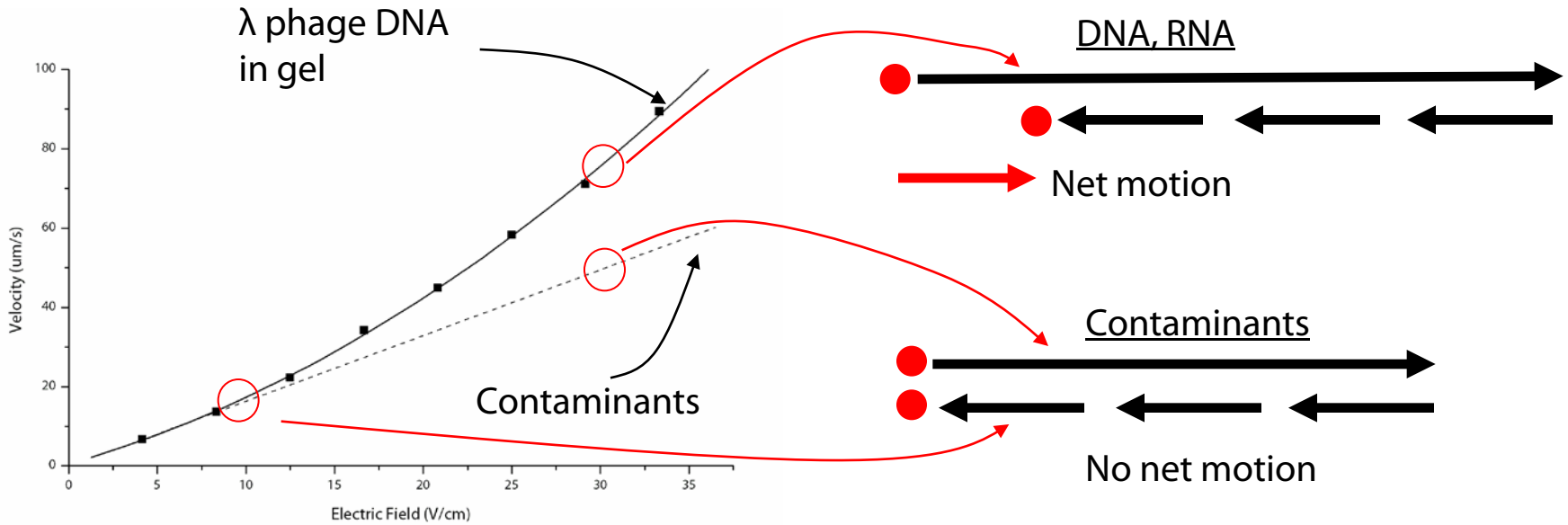


## Plants

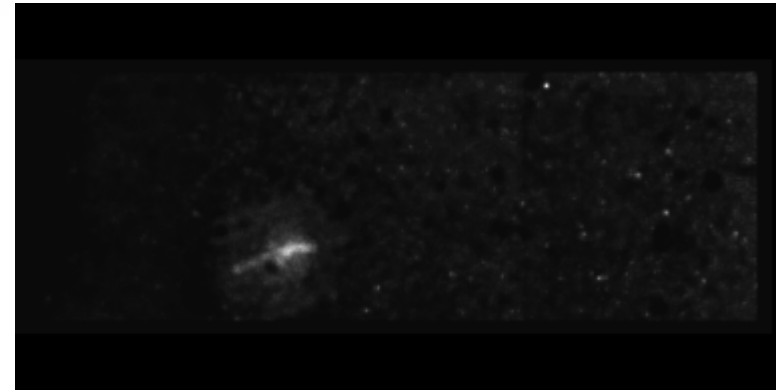
- DNA extraction from plant material
- Extracted amplifiable DNA from 60 yr old leaves
- All other methods failed



# SCODA Technology – A simplified analogy



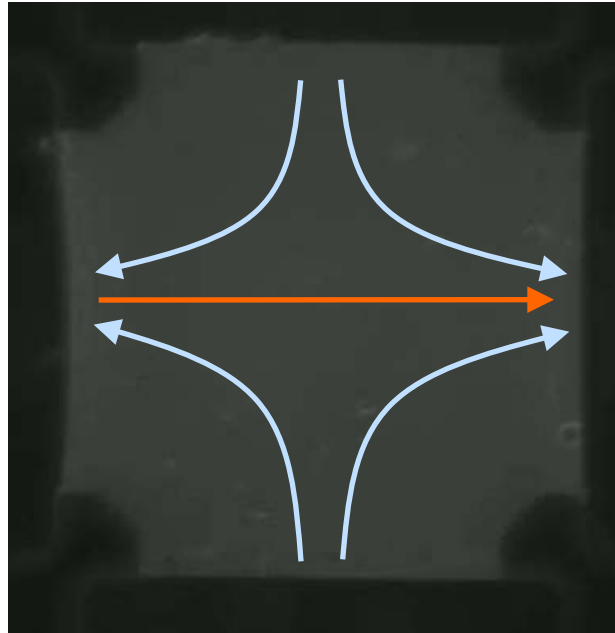
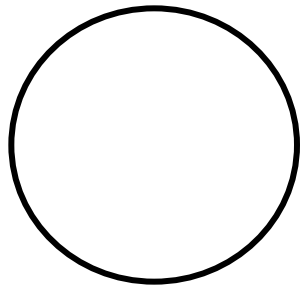
Non-linear electrophoresis moves nucleic acids, leaving contaminants stationary.



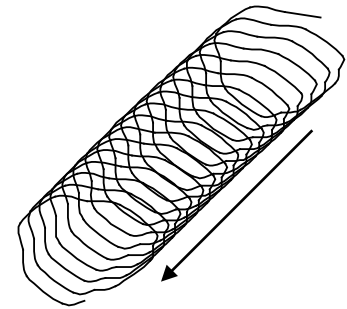
<http://www.umich.edu/~morgroup/hsvm.html>



Most molecules:

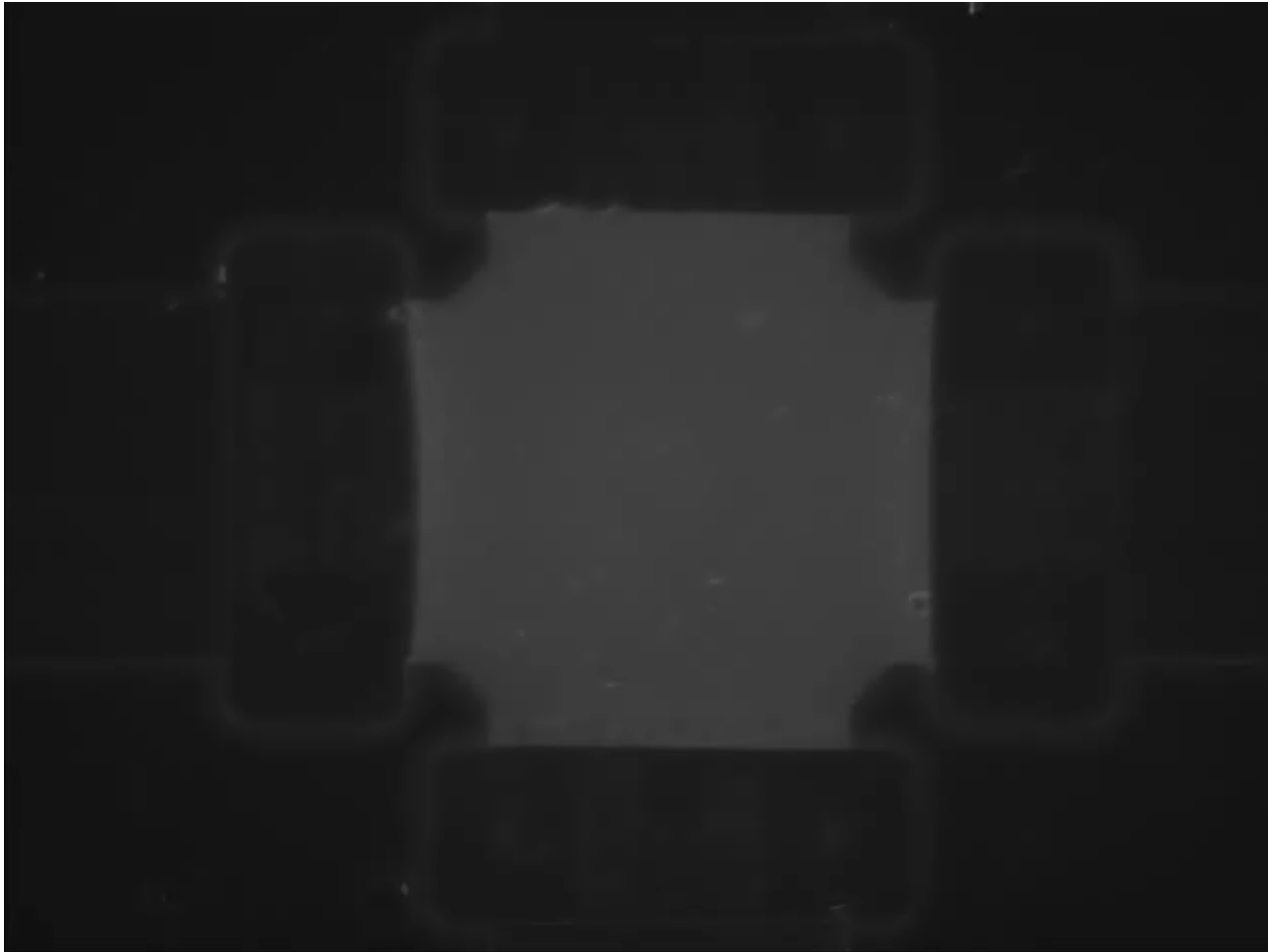


DNA and RNA:



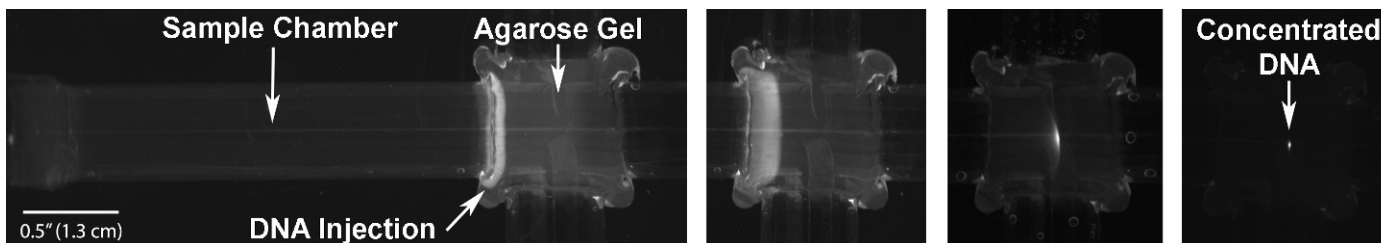
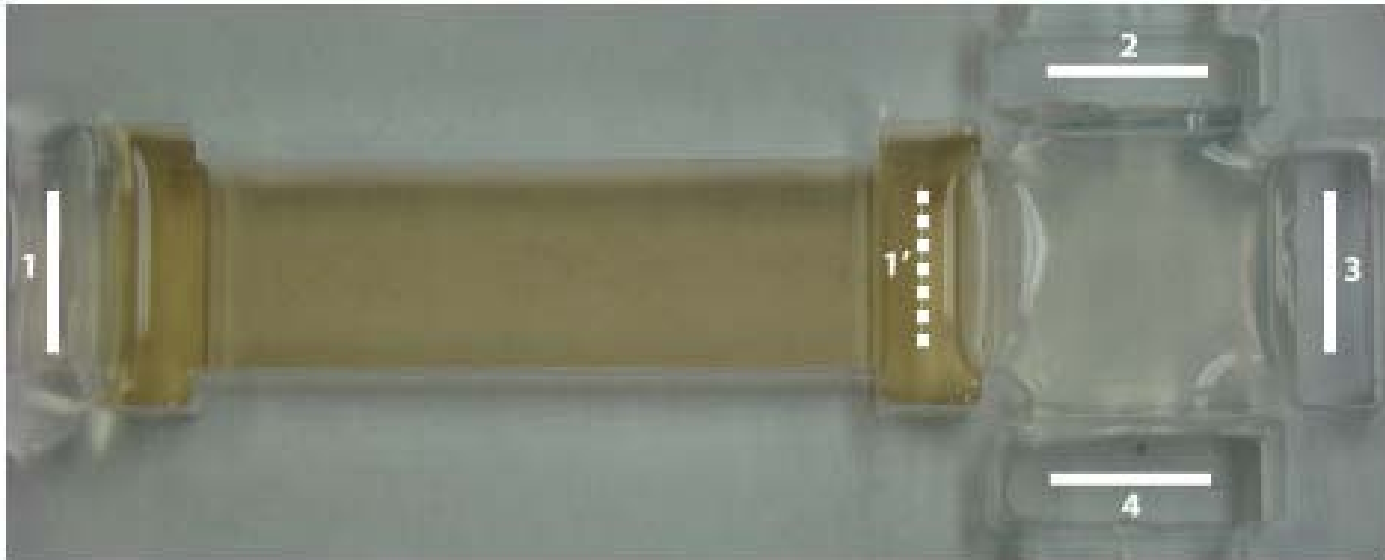
Rotating electric fields focus nucleic acids in the center of a gel





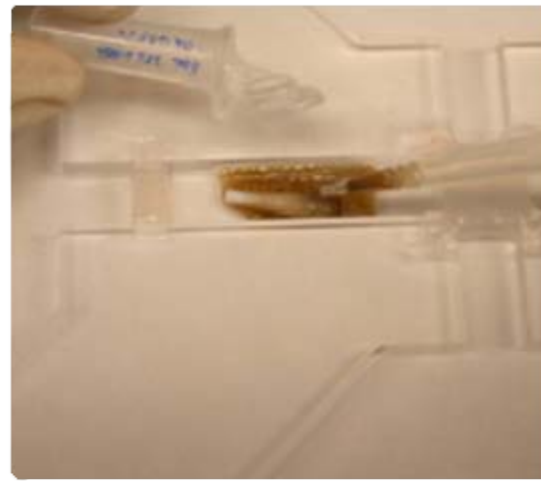
A. Marziali, J. Pel, D. Bizzotto, L. Whitehead, *Electrophoresis* 2005, 26, 82–90





DNA is injected from adjacent 1-5mL reservoir and focused to a point

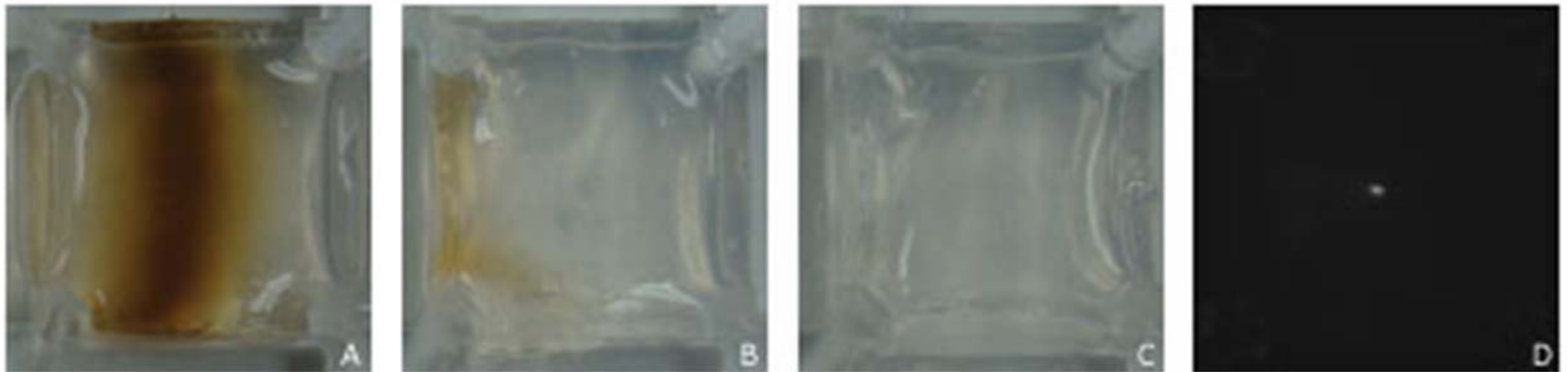




Absence of fluid flow allows for samples containing solids

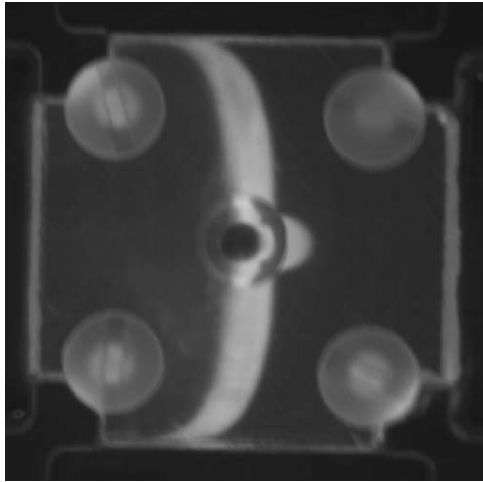
D. Broemeling et al. *JALA* 2008



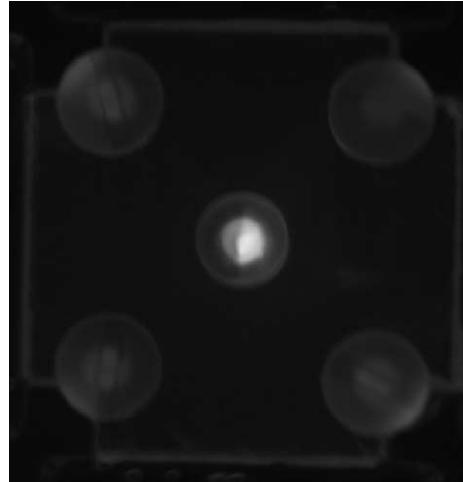


Contaminants are washed out electrically while the DNA is held in the center

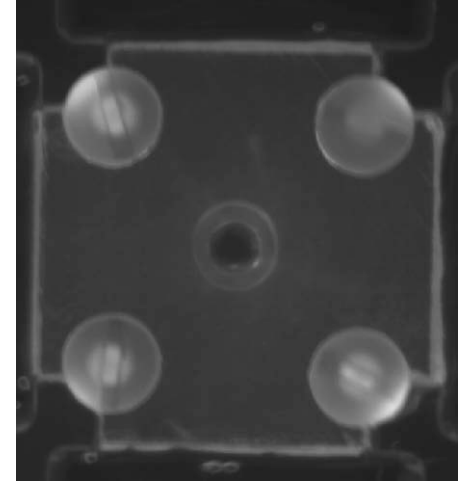




Injection



Concentration



Removal

Eluted DNA is recovered into 15 – 60  $\mu\text{L}$  of buffer

