

# 5. PREDAVANJE

**Naš zadatak je**  
**da pomognemo ljudima koji**  
**se bave poljoprivredom, da**  
**unaprijede životne uslove kroz**  
**proces učenja, odnosno, da ih**  
**naučimo kako da upotrijebe znanje.**





Laboratorija za  
biljnu nematologiju

# Tehnike rada sa nematodama

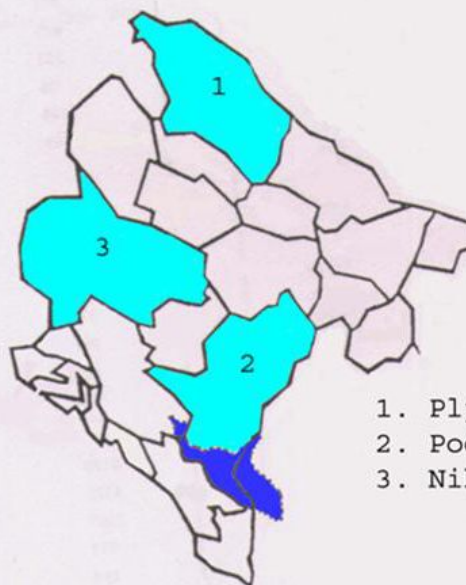
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% PARTICIPATE OF SURFACE OF MONTENEGRO



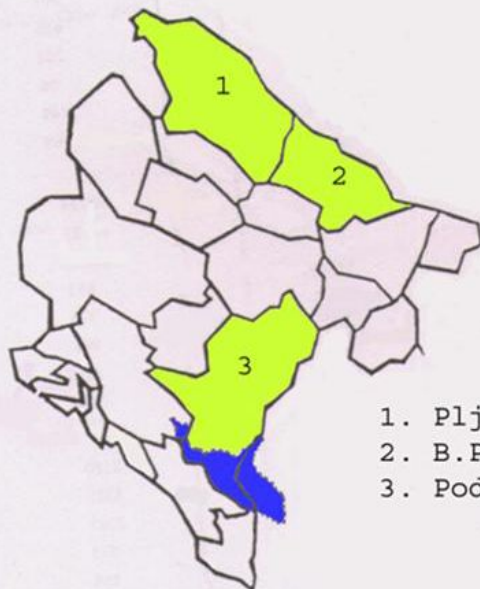
1. Niksic - 14,95%
2. Podgorica - 10,43%

AGRICULTURE SURFACE (518824)



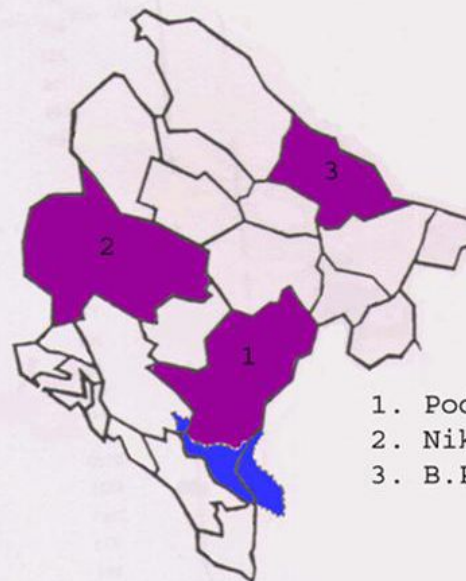
1. Pljevlja - 13,44%
2. Podgorica - 11,95%
3. Niksic - 10,53%

GARDENS (49983)



1. Pljevlja - 16,40%
2. B.Polje - 14,88%
3. Podgorica - 12,83%

VEGETABLES AND FLOWERS (19143)



1. Podgorica - 19,31%
2. Niksic - 14,57%
3. B.Polje - 12,37%



istorija parcele





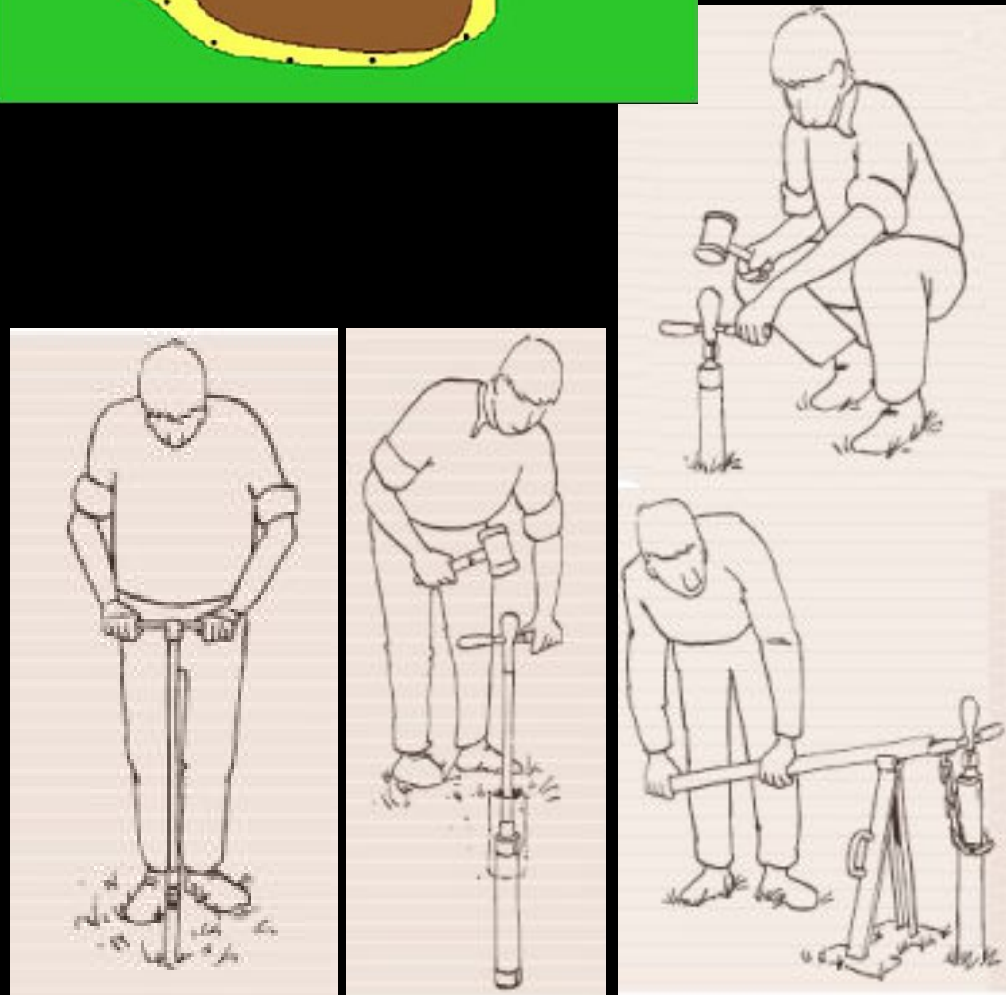
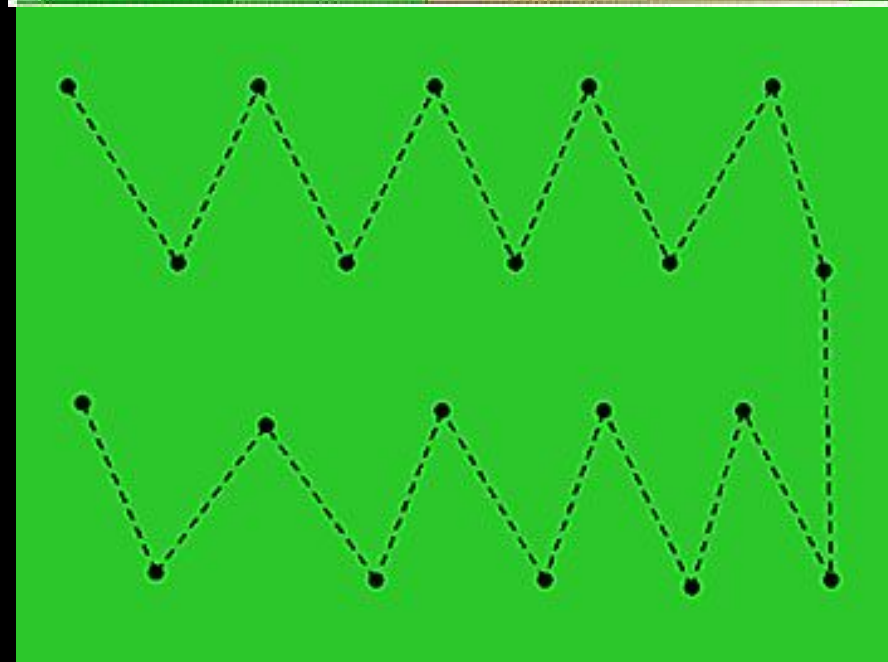
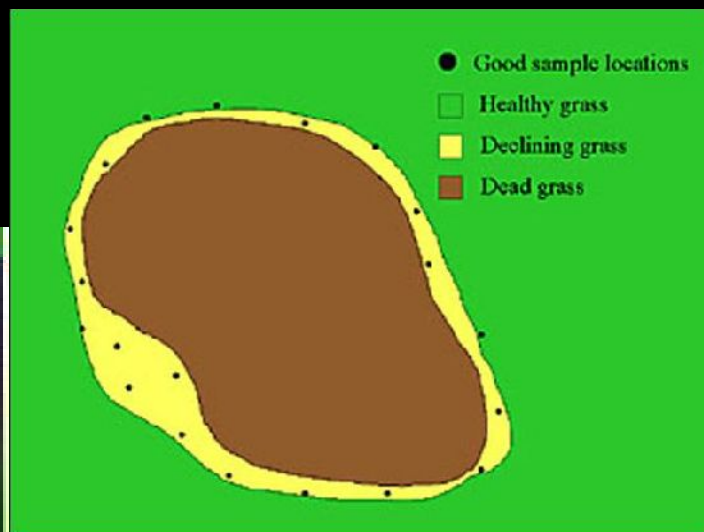
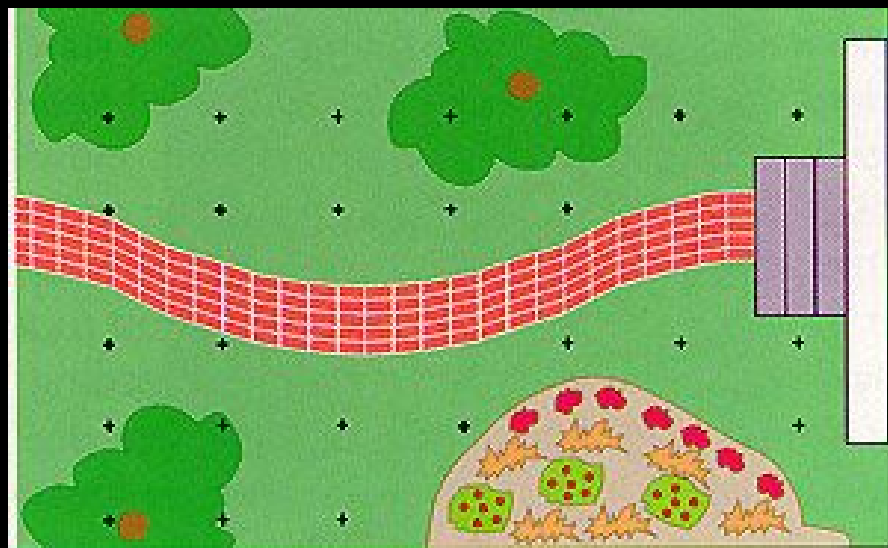


Laboratorija za  
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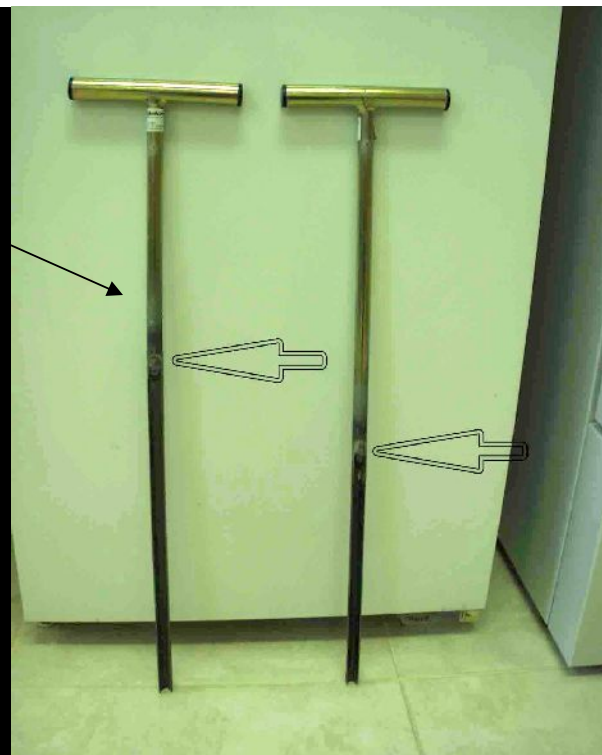
# Uzimanje uzoraka

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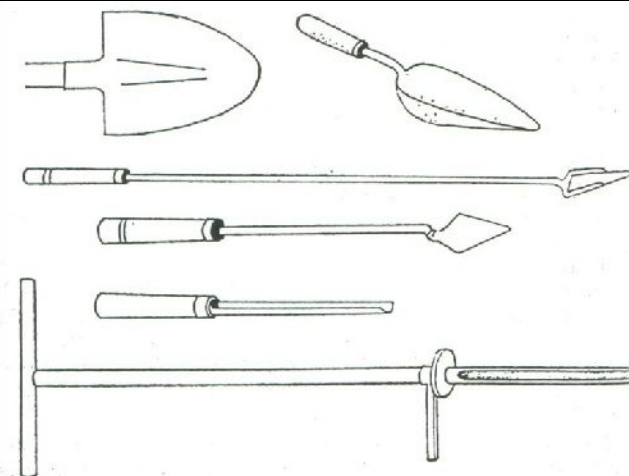
# UZIMANJE ZEMLJIŠNOG UZORKA



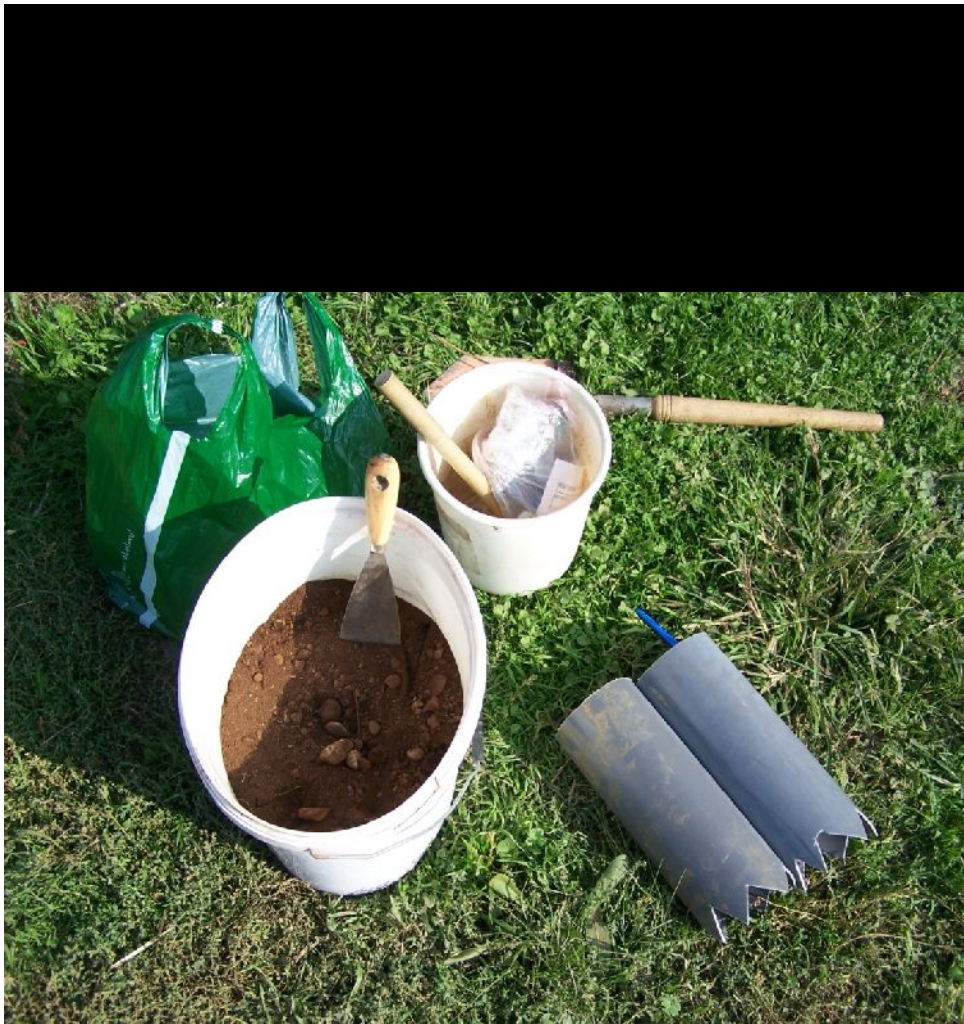
T tip  
uzorkivača



Alatke za uzorkovanje

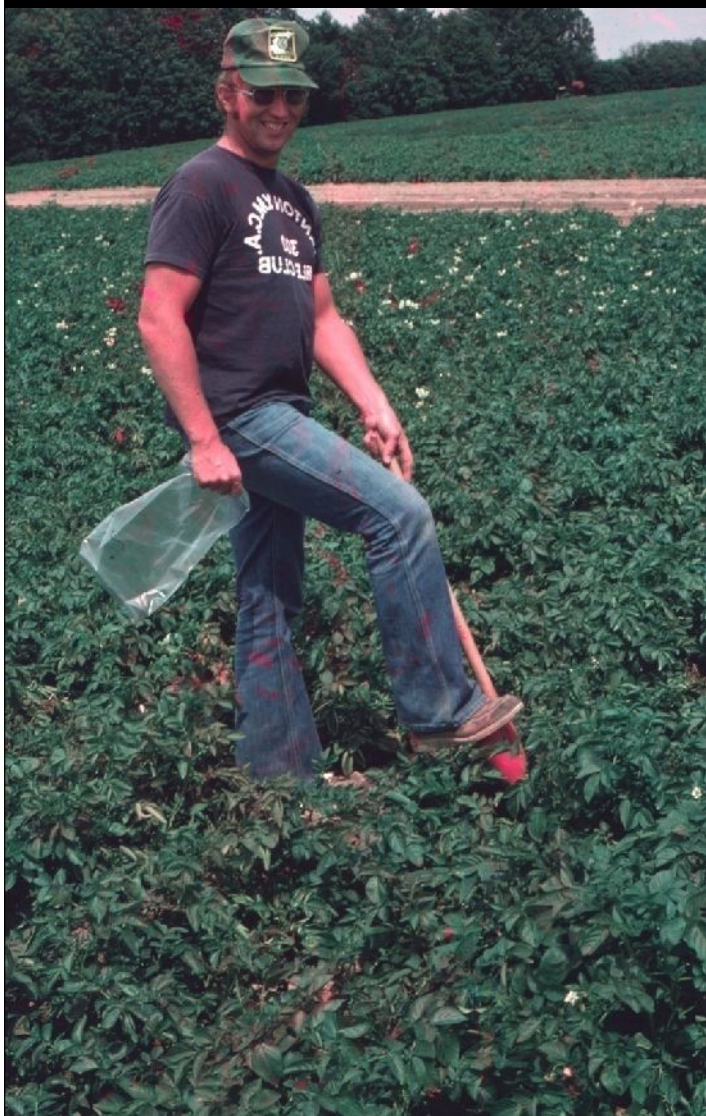








Sampler koji koriste u laboratoriji za nematologiju Državnog Univerziteta u Mičigenu



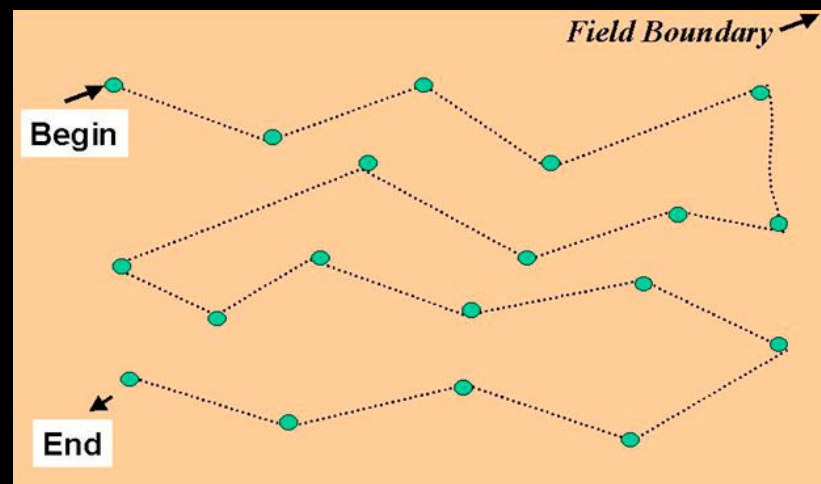


Uzimanje uzoraka za utvrđivanje prisustva nematoda iz rodova *Xiphinema* i *Longidorus* spp





**Polje za proizvodnju ranog konzumnog krompira**  
**Podhum, Tuzi**





Laboratorija za  
biljnu nematologiju

# Oznacavanje i transport uzoraka do laboratorije

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## Označavanje uzoraka

| OREGON STATE UNIVERSITY PLANT-PARASITIC NEMATODE TEST FORM                                                                                                                                                          |                             |               |                                      |      |              |           |                                  |                    |                                |                                |                                             |  |                        |  |              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|---------------|--------------------------------------|------|--------------|-----------|----------------------------------|--------------------|--------------------------------|--------------------------------|---------------------------------------------|--|------------------------|--|--------------|
| 1089 Cordley Hall, Corvallis, OR 97331-2903. (541) 737-5540                                                                                                                                                         |                             |               |                                      |      |              |           |                                  |                    |                                |                                |                                             |  |                        |  |              |
| See next page for sampling instructions, service descriptions, and test fees.                                                                                                                                       |                             |               |                                      |      |              |           |                                  |                    |                                |                                |                                             |  |                        |  |              |
| SUBMITTER AND GROWER INFORMATION                                                                                                                                                                                    |                             |               |                                      |      |              |           |                                  |                    |                                |                                |                                             |  |                        |  |              |
| Submitter: please complete                                                                                                                                                                                          |                             |               |                                      |      |              |           |                                  |                    |                                |                                |                                             |  |                        |  |              |
| This is Your Address Label                                                                                                                                                                                          |                             |               |                                      |      |              |           |                                  |                    |                                |                                |                                             |  |                        |  |              |
| Name/Co.                                                                                                                                                                                                            |                             |               |                                      |      |              |           |                                  |                    |                                | Date submitted:                |                                             |  | LAB USE ONLY<br>Rec'd. |  |              |
| Address                                                                                                                                                                                                             |                             |               |                                      |      |              |           |                                  |                    |                                | Phone ( ) Fax                  |                                             |  | Fee Invoice            |  |              |
| City/State/Zip                                                                                                                                                                                                      |                             |               |                                      |      |              |           |                                  |                    |                                | Grower                         |                                             |  | Reply                  |  |              |
|                                                                                                                                                                                                                     |                             |               |                                      |      |              |           |                                  |                    |                                | County                         |                                             |  | Paid Dec               |  |              |
| LAB<br>USE<br>ONLY                                                                                                                                                                                                  | SAMPLE INFORMATION          |               |                                      |      |              |           |                                  |                    |                                |                                | RESULTS: Lab use only                       |  |                        |  |              |
|                                                                                                                                                                                                                     | Submitter: please complete  |               |                                      |      |              |           |                                  |                    |                                |                                | All plant-parasitic nematodes are reported. |  |                        |  |              |
|                                                                                                                                                                                                                     | <u>Field Identification</u> |               | <u>Sample type:</u><br>Check box(es) |      | <u>Crops</u> |           | Pratylenchus:<br>Lesion nematode |                    | Paratylenchus:<br>Pin nematode |                                | Meloidogyne:<br>Root-knot nematode          |  |                        |  |              |
|                                                                                                                                                                                                                     | PCN No.                     | Sample Number | Area/<br>Description                 | Soil | Roots        | Sp.<br>ID | Recent                           | Current/<br>Future |                                |                                |                                             |  |                        |  |              |
|                                                                                                                                                                                                                     |                             |               |                                      |      |              |           |                                  |                    |                                |                                |                                             |  |                        |  |              |
|                                                                                                                                                                                                                     |                             |               |                                      |      |              |           |                                  |                    |                                |                                |                                             |  |                        |  |              |
|                                                                                                                                                                                                                     |                             |               |                                      |      |              |           |                                  |                    |                                |                                |                                             |  |                        |  |              |
| Soil sample results are reported as nematodes/100 grams soil corrected for soil moisture. Multiply this number by 20 for nematodes"/quart" (2000 g).<br>Root sample results are reported as nematodes/g fresh root. |                             |               |                                      |      |              |           |                                  |                    |                                |                                |                                             |  |                        |  |              |
| [Return to Submitting Samples] [Return to Sampling] [Table of Contents] [Home]                                                                                                                                      |                             |               |                                      |      |              |           |                                  |                    |                                | SEE NEXT PAGE FOR INSTRUCTIONS |                                             |  |                        |  |              |
|                                                                                                                                                                                                                     |                             |               |                                      |      |              |           |                                  |                    |                                |                                |                                             |  |                        |  | Nematologist |

# DIAGNOSTIC SERVICES

101 Center for Integrated Plant Systems  
East Lansing, MI 48824-1311  
Office: 517-355-4536 FAX: 517-432-0899  
www.pestid.msu.edu

Case No.: \_\_\_\_\_  
Date Received: \_\_\_\_\_  
Amount Paid: \_\_\_\_\_  
Check/Receipt No.: \_\_\_\_\_  
MSU Account #: \_\_\_\_\_  
Diagnostic Fee: \_\_\_\_\_

Name: \_\_\_\_\_  
Business Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
City/State/Zip: \_\_\_\_\_  
Work: ( ) FAX: ( ) Home: ( )  
Email: \_\_\_\_\_ Cell: ( )  
Sample Reference: \_\_\_\_\_

**Plant Disease Diagnostic Fees**  
Plant health analysis \$20  
INSECT / TERMITES/SLUGS/NEED \$20  
Bacterial ID (BIOLOGIX™) \$25  
Insect / Plant Identification Fees  
Common ID: \$10  
Keyed ID: \$10  
Special ID diagnosis (Per hour charge): contact lab  
Herbicide Resistance / Pesticide Analysis: contact lab  
Non-disease Sample Fees (see below)

Out of State Fees Double  
Fees subject to change

**SEND RESULTS TO:** ☐ CLIENT ☐ COUNTY AGENT ☐ KEEP RESULTS CONFIDENTIAL Fax: ( )  
MSU Extension Agent: \_\_\_\_\_ County: \_\_\_\_\_ Email: \_\_\_\_\_

## SAMPLE (ex. Tomato, Insect, Pine, etc.)

### GENERAL INFORMATION (indicate all that apply)

#### PLANT PARTS AFFECTED

Entire Plant \_\_\_\_\_  
Leaves/Needles \_\_\_\_\_  
Twigs/Limbs \_\_\_\_\_  
Trunk \_\_\_\_\_  
Fruit \_\_\_\_\_  
Flowers \_\_\_\_\_

#### NATURE OF THE INJURY

Poor or Abnormal Growth \_\_\_\_\_  
Spots \_\_\_\_\_  
Wilting \_\_\_\_\_  
Plant Death \_\_\_\_\_  
Leaf/Needle Drop \_\_\_\_\_  
Chewing \_\_\_\_\_  
Rot \_\_\_\_\_  
Galls/Cankers \_\_\_\_\_

#### SOIL TYPE

Sandy \_\_\_\_\_  
Clay \_\_\_\_\_  
Silt/Loam \_\_\_\_\_

#### TYPE OF PLANTING

Field \_\_\_\_\_  
Nursery \_\_\_\_\_  
House Plant \_\_\_\_\_  
Greenhouse \_\_\_\_\_  
Orchard \_\_\_\_\_  
Turf/Lawn \_\_\_\_\_  
City/Recreation \_\_\_\_\_

#### PREVALENCE

Entire Planting \_\_\_\_\_  
Single Localized Area \_\_\_\_\_  
Several Localized Areas \_\_\_\_\_  
Few Scattered Plants \_\_\_\_\_

#### EXTENT OF THE DAMAGE

Light \_\_\_\_\_ Moderate \_\_\_\_\_ Severe \_\_\_\_\_

#### DRAINAGE

Good \_\_\_\_\_ Fair \_\_\_\_\_ Poor \_\_\_\_\_

#### PROBLEM DISTRIBUTION

Upland \_\_\_\_\_  
Slopes \_\_\_\_\_  
Low Areas \_\_\_\_\_  
Near Drive/Road \_\_\_\_\_  
Edge of Field \_\_\_\_\_  
Near a Residence \_\_\_\_\_

#### OTHER BACKGROUND

How long at site? \_\_\_\_\_

Height of plant? \_\_\_\_\_

How many plants affected? \_\_\_\_\_

How often watered? \_\_\_\_\_

How fertilized? \_\_\_\_\_

Sunny or Shaded? \_\_\_\_\_

#### HERBICIDE HISTORY

This year: \_\_\_\_\_

Last year: \_\_\_\_\_

#### INSECTICIDE HISTORY

This year: \_\_\_\_\_

#### FUNGICIDE HISTORY

This year: \_\_\_\_\_

#### CROP HISTORY

Last year: \_\_\_\_\_

This year: \_\_\_\_\_

Next year: \_\_\_\_\_

### INSECT / ARTHROPOD ID SAMPLES ONLY (indicate all that apply)

Where was the insect found? \_\_\_\_\_ What was the insect doing there? \_\_\_\_\_  
How many insects are there? One Few Several Hundreds Do you have small children living with you? \_\_\_\_\_

### PLANT / WEED ID SAMPLES ONLY (indicate all that apply)

| PLANT TYPE |             | PLANT SIZE             | GROWTH HABIT          | FLOWERS                         | PLANT AGE        |
|------------|-------------|------------------------|-----------------------|---------------------------------|------------------|
| Tree       | Groundcover | Height: _____          | Upright/Erect         | Color: _____                    | Annual: _____    |
| Shrub      | Herbaceous  | Width: _____           | Prostrate/Low-Growing | Size: _____                     | Perennial: _____ |
| Vine       | Aquatic     | Few Leaves Many Leaves | Climbing              | List any unique features: _____ |                  |

### NEMATODE SAMPLES ONLY (indicate type of analysis requested)

☐ Soil and root analysis (\$20/sample) ☐ Foliar nematode analysis (\$20/sample)  
☐ Total nematode community structure analysis (\$50/sample)  
☐ Hg Type test (\$50/sample)  
*Verticillium dahliae* analysis (potato soil / stem only) ☐ Dilution (\$15/sample) ☐ Wet-sieving (\$20/sample) ☐ Both (\$35/sample)

No. of samples: \_\_\_\_\_  
Sample Field ID: \_\_\_\_\_

|                                                                                    |                                                             |                             |
|------------------------------------------------------------------------------------|-------------------------------------------------------------|-----------------------------|
| Ime, prezime, adresa, broj telefona:                                               |                                                             | Šifra: proizvođač/br.uzorka |
| Datum uzimanja uzorka:                                                             | Trenutni usjev u plasteniku, odnosno koji treba da se sadi: | Predhodni usjev:            |
| T°C                                                                                | Vazduha: Zemljišta:                                         |                             |
| Opis trenutnog stanja usjeva i problema koji se eventualno javljaju u proizvodnji: |                                                             |                             |



Laboratorija za  
biljnu nematologiju

# Laboratorijska oprema

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# Laboratorijska oprema

Čisti dio laboratorije

Dio laboratorije za procesuiranje uzoraka

Centrifuga

Baerman lijevci

Mikser





A photograph of a laboratory setup. On the wall, there is a white water heater and two stainless steel elutriators connected by green pipes. The elutriator on the left is a wide-bottomed cone, while the one on the right is a narrow vertical tube. Below them is a sink with a faucet and some yellow hoses. To the left of the sink is a white cabinet with several drawers. On the far left, there is a window with brown blinds and a small stand with a container. The text 'Oostenbrinckov elutriator' is written in yellow next to the wide-bottomed elutriator, and 'Kort'sov elutriator' is written in yellow next to the narrow vertical elutriator.

Oostenbrinckov  
elutriator

Kort'sov  
elutriator





Oostenbrinckov  
elutriator



Kort'sov  
elutriator



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# Ekstrakcija nematoda

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## Ekstrakcija nematoda

Metod ekstrakcije zavisi od tipa nematoda i od tipa uzorka (zemljište ili biljni materijal).

| Metode ekstrakcije             | Korijen/lišće     |            | Uzorci zemljišta |            |
|--------------------------------|-------------------|------------|------------------|------------|
|                                | Nematode paraziti |            |                  |            |
|                                | Sedentorni        | Migratorni | Sedentorni       | Migratorni |
| Cobov metod sa sitima          |                   |            | X                | X          |
| Sitnjenje korijena             | X                 | X          |                  |            |
| Inkubacija (Baermann's funnel) | X                 | X          | X                | X          |
| Centrifuga                     | X                 | X          | X                | X          |
| Fenwick's method *             |                   |            | X                |            |

\* Za cistolike nematode.



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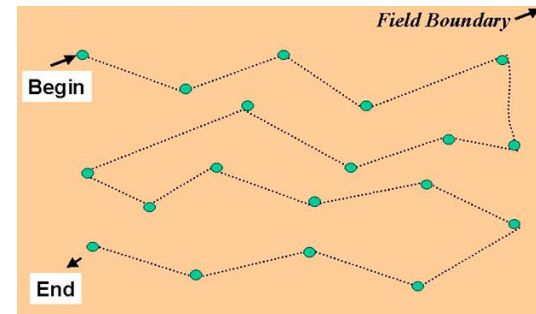
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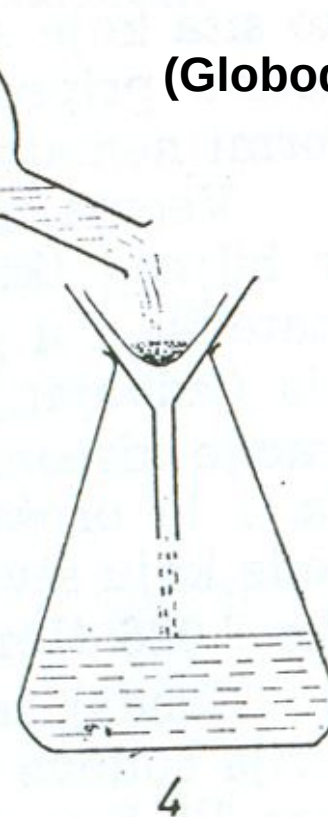
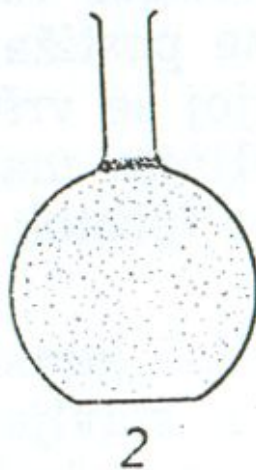
Izdvajanje prosijavanjem



Izdvajanje cista iz vazdušno suvih uzoraka zemljišta

(Globodera)

Izdvajanje potapanjem  
potapnjem





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||

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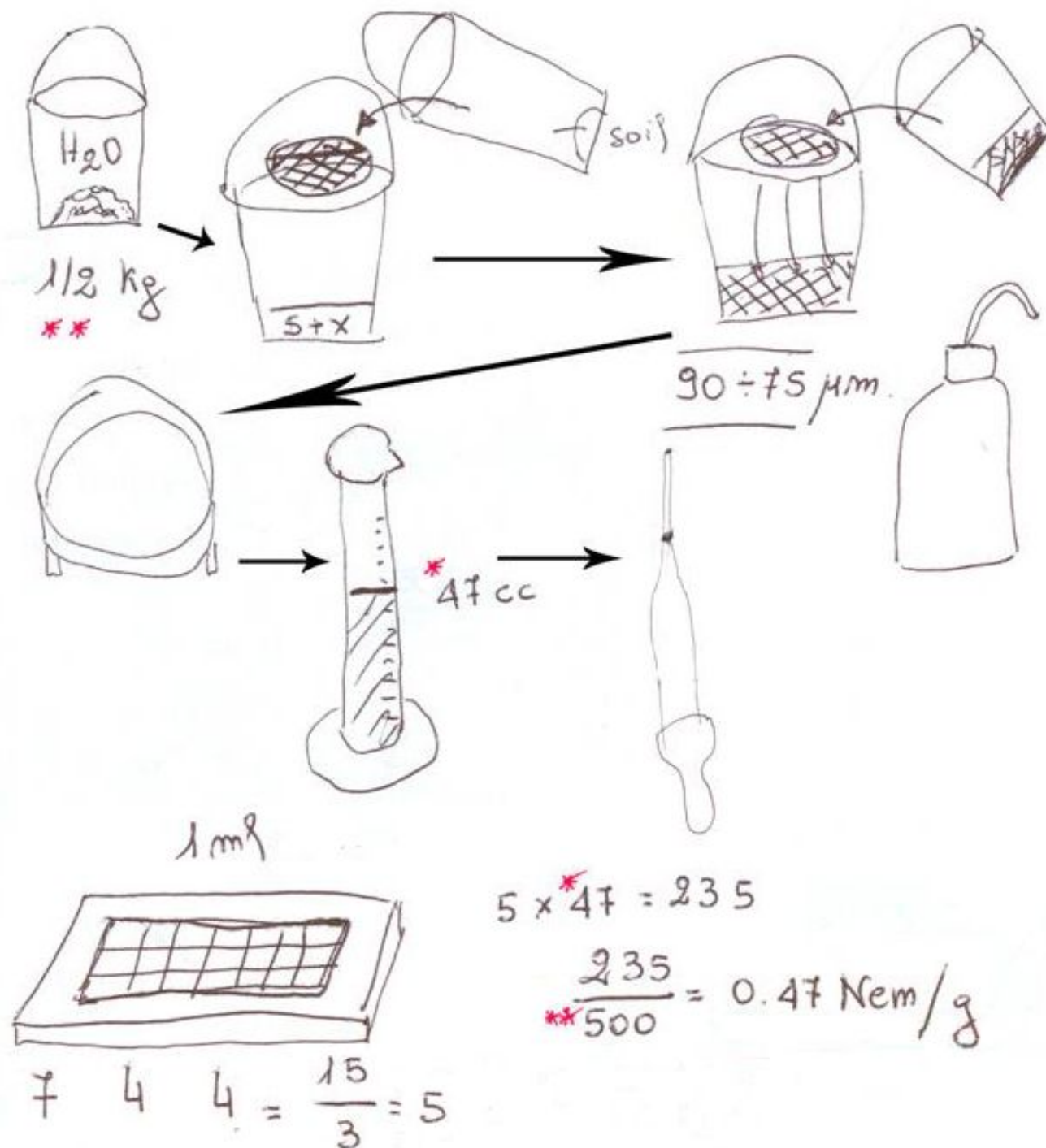
## Tehnika prosijavanja, postupak ekstrakcije vlažnih uzoraka zemlje



### Cobbov metod – korišćenje sita

1. Staviti 100 cm<sup>3</sup> zemljišta u kofu i dodati oko 3 litara vode. Miješati, a zatim sačekati oko 10-20 sekundi da se krupne čestice zemlje natalože.
2. Lagano tečni dio mješavine sasuti kroz sito promjera 2 mm u drugu kofu, ne dozvolivši da talog pređe iz jedne u drugu kofu.
3. Ponoviti proceduru, opet čekajući 10 - 20 sekundi taloženje.
4. Lagano presuti sadržaj druge kofe na sito dimenzija 90-53  $\mu\text{m}$  (250-50).
5. Sakupiti sadržaj, nematode i malo taloga u posudu sa sita 90-53 (250-50)  $\mu\text{m}$ . Ili prebaciti na manje sito istog promjera. U tom slučaju to manje sito staviti u Petri posudu tako da dnom dodiruje vodu koju ćemo sipati u petrijevku.
6. Ovako se ostavi sito na petrijevcu najmanje 6 sati a najduže jedan dan.
7. Sakupljene nematode iz Petri posude se pregledaju i identifikuju pod lupom i mikroskopom.

Procedura pri  
 ekstrakciji slobodno -  
 živećih nematoda i  
 proračun napada  
 po gramu zemlje





## Procesuiranje vlažnih uzoraka zemlje, laboratorija u Bariju

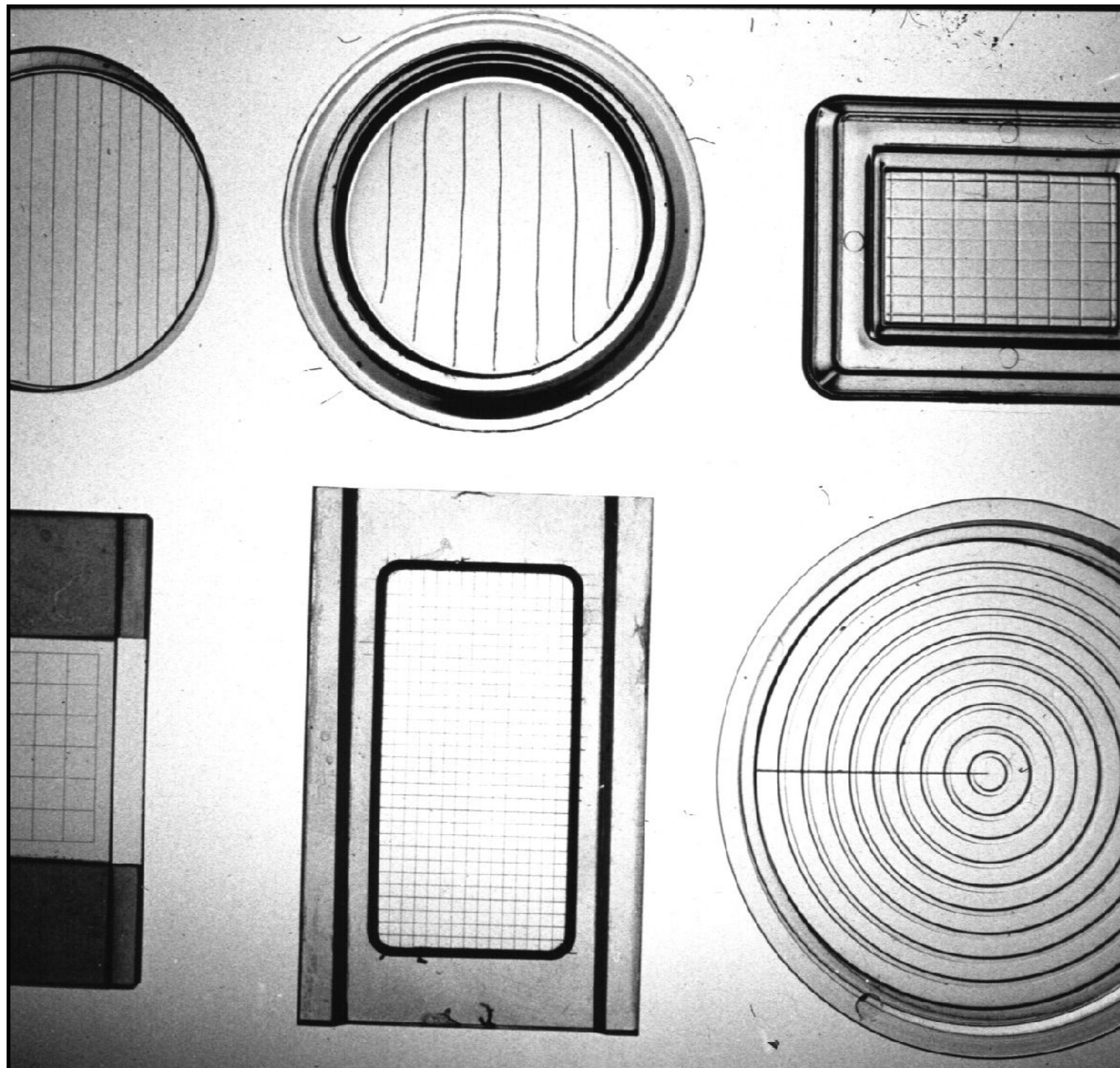








Posude za  
brojanje  
nematoda





## Kombinovano prosijavanje i Baermannovi lijevci

vlažnih uzoraka zemlje

Oostenbrinkova modifikovana metoda iz 1960 godine, metode prosijavanja po Coob-u iz 1918, kombinovana sa idejom Hržića iz 1973. i Baermannov postupak ustanovljen 1907.



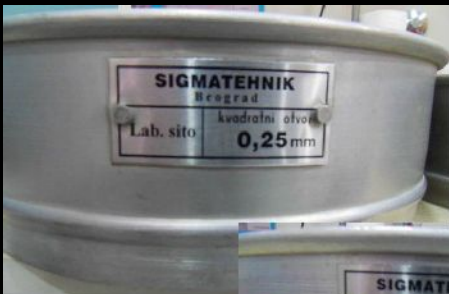








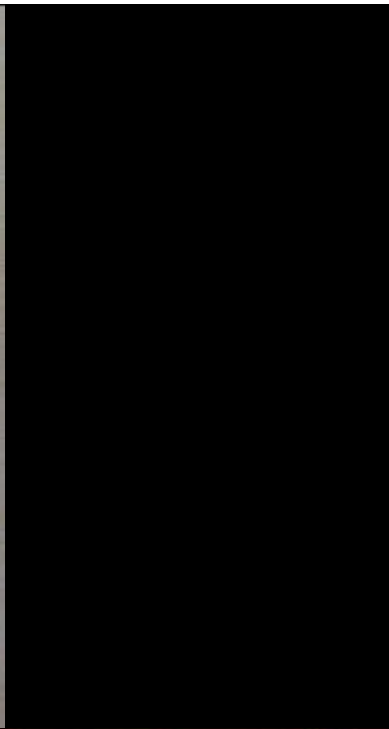
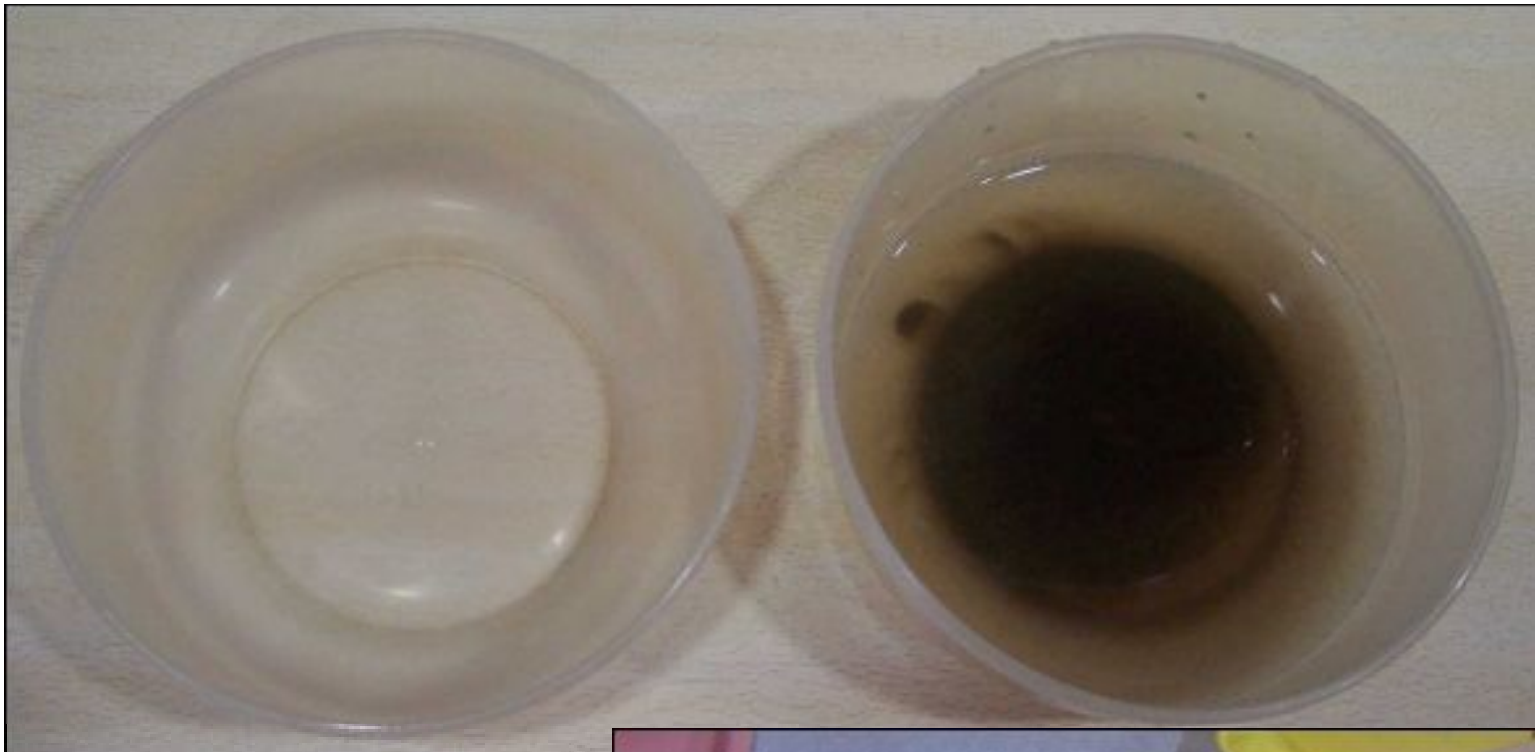
## Sita



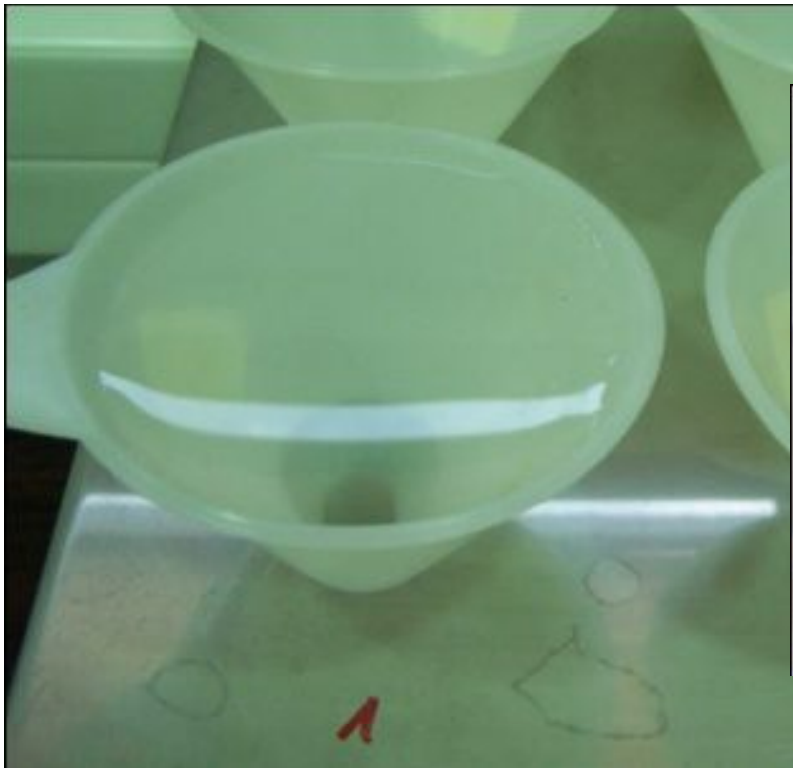






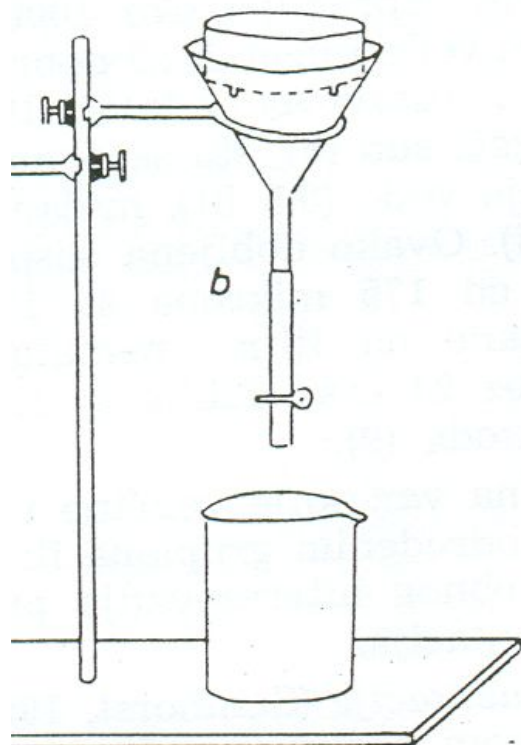




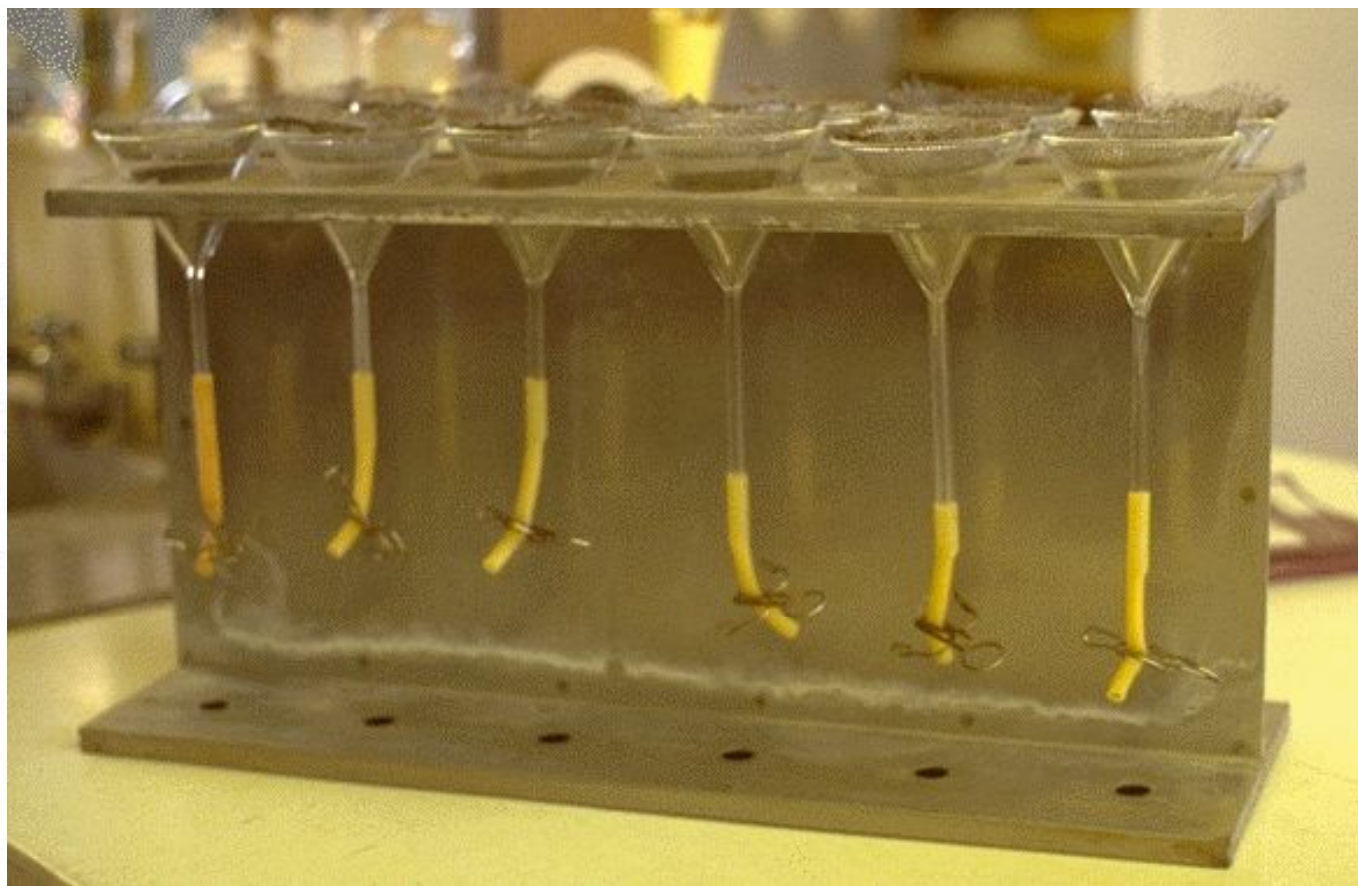




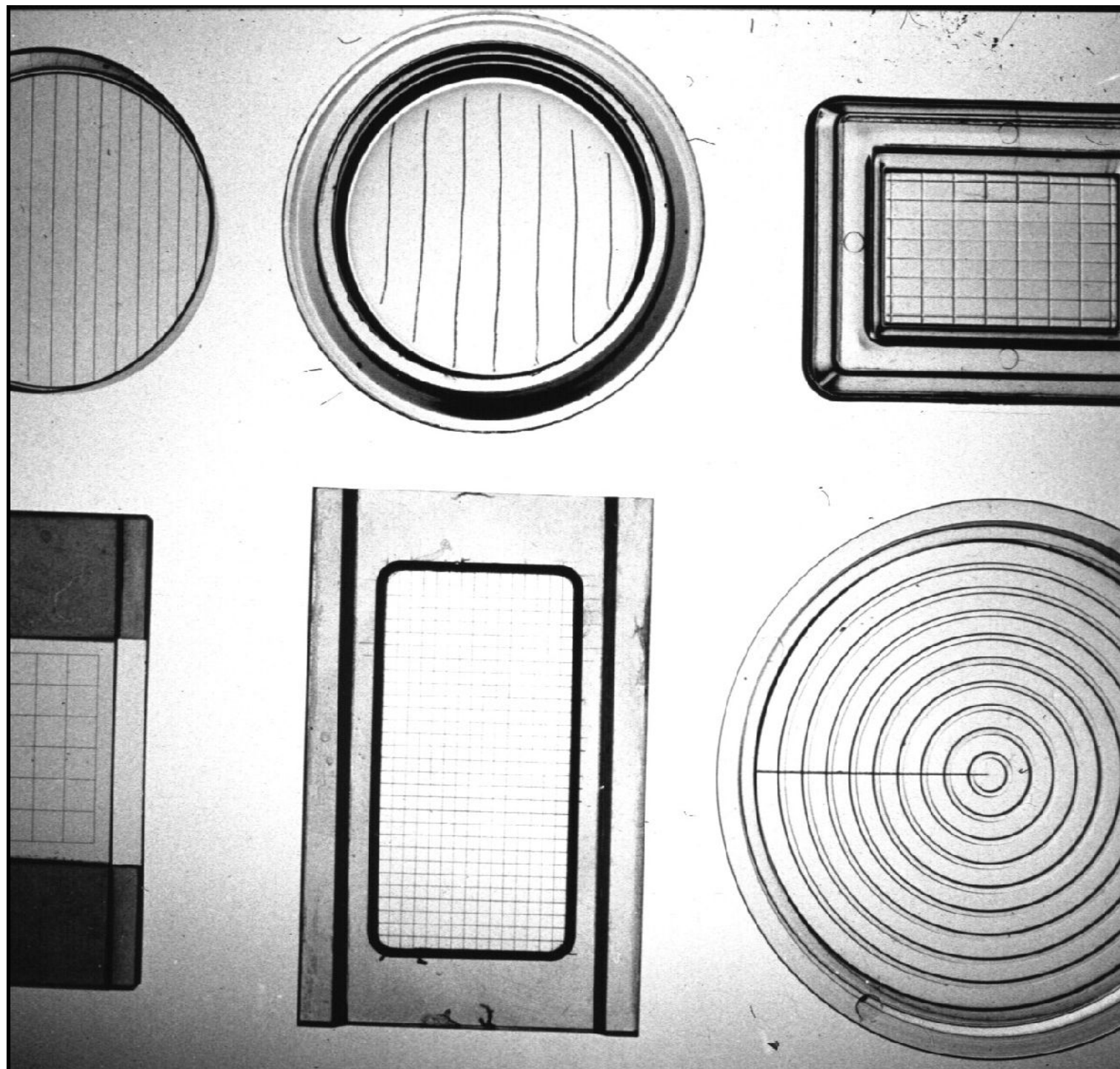
## Baermannovi lijevci, Baermannov postupak ekstrakcije vlažnih uzoraka zemlje



Bermanov metod



Posude za  
brojanje  
nematoda







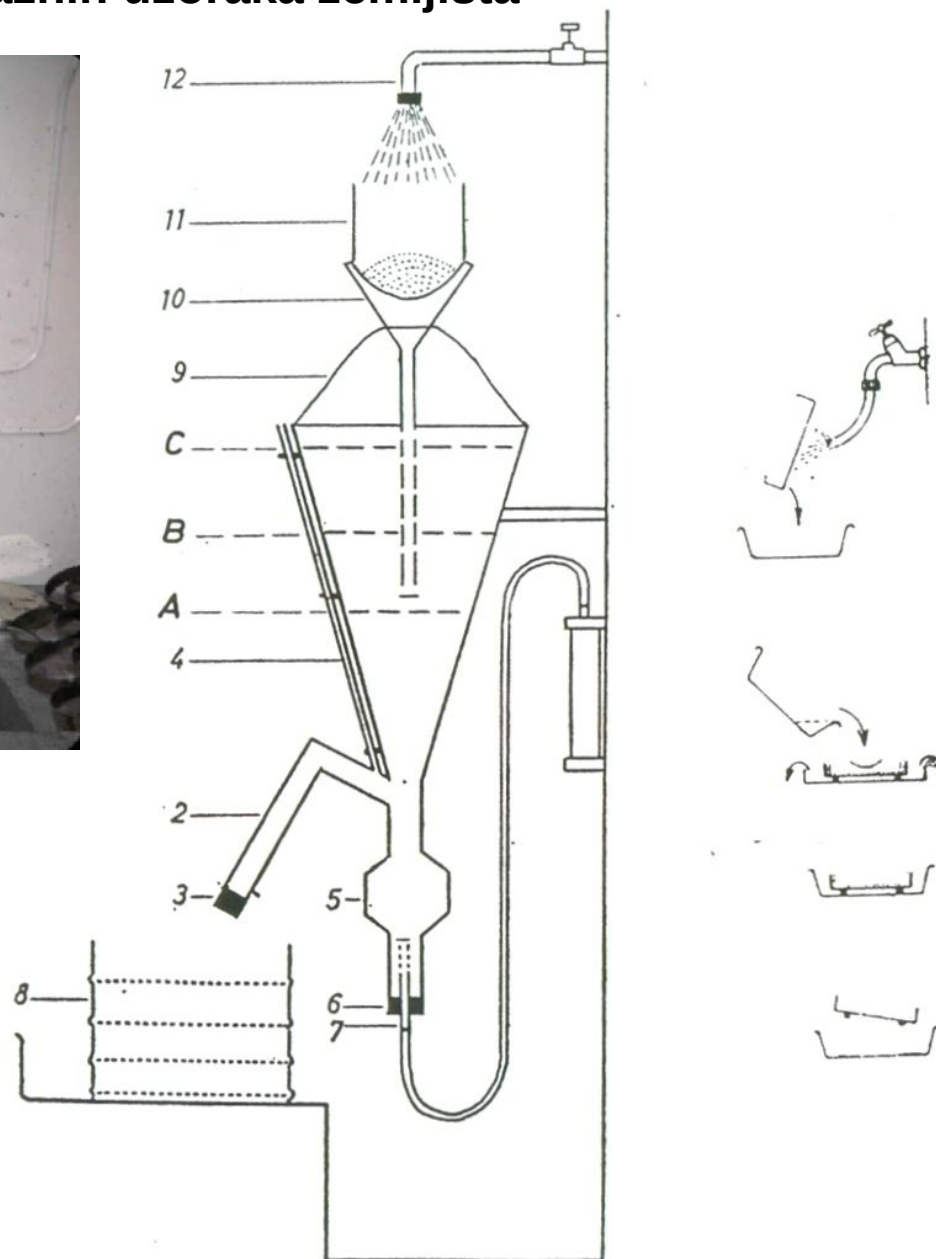
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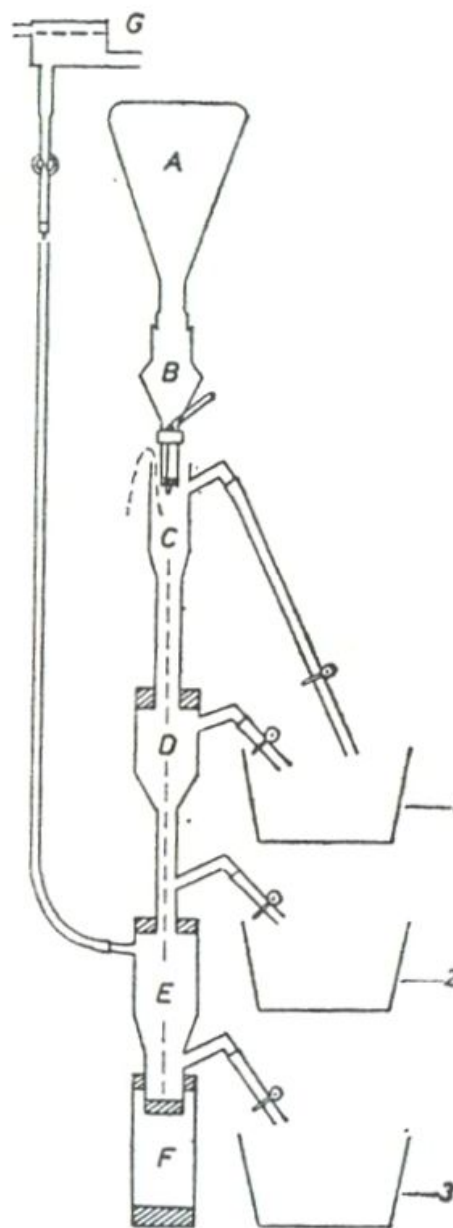


# Oostenbrinkov elutriator i Oostenbrinkov postupak ekstrakcije vlažnih uzoraka zemljišta



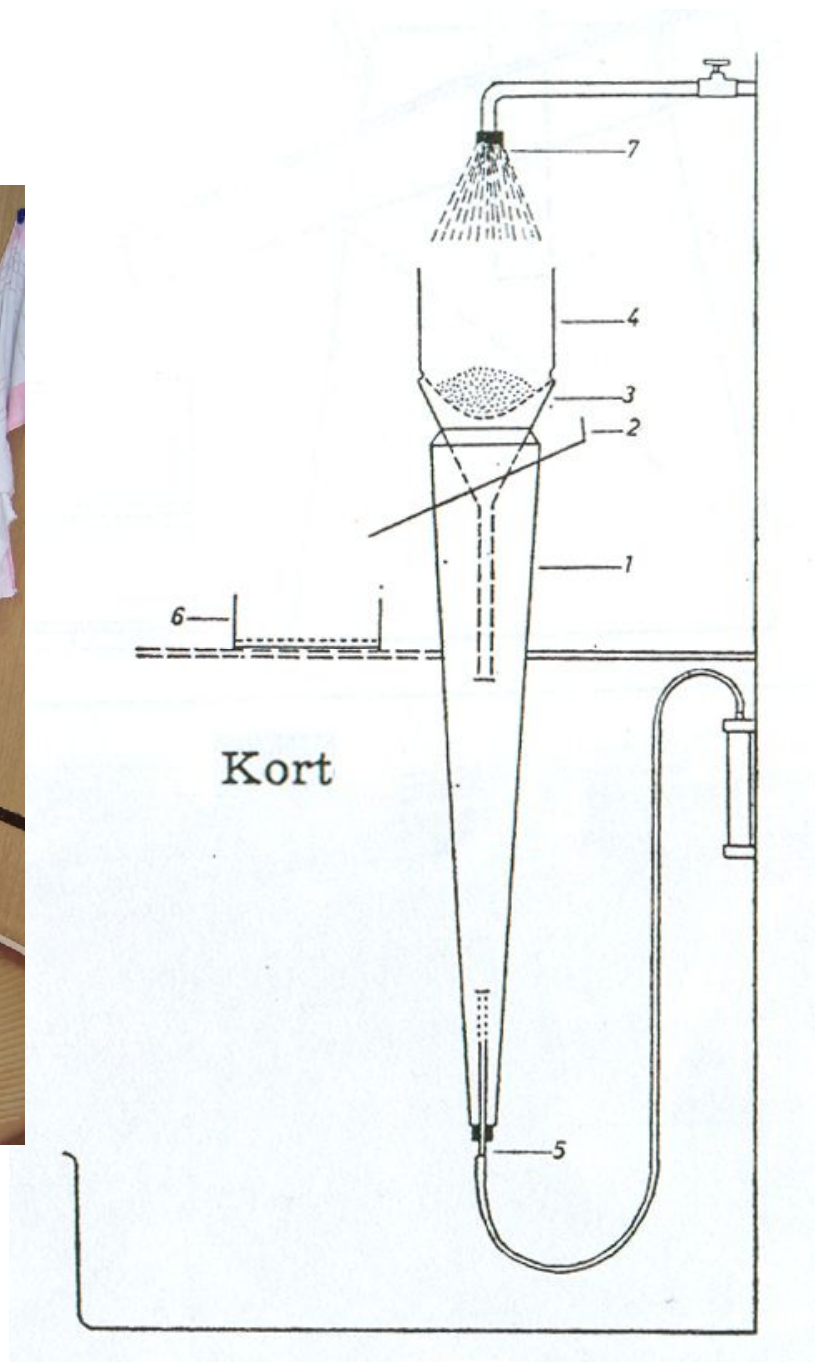


## Seinhorstov aparat i postupak ekstrakcije vlažnih uzoraka zemljišta





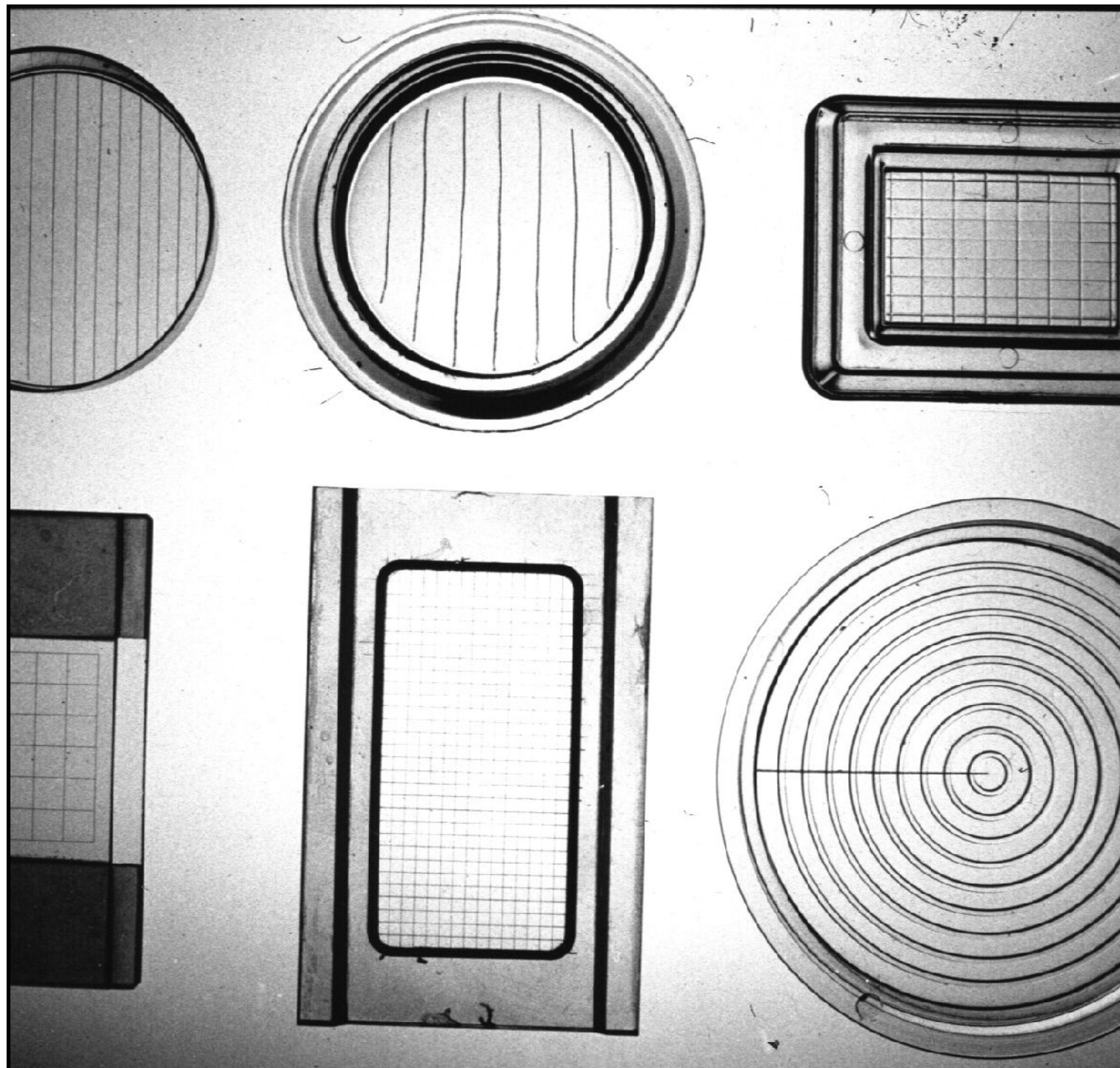
## Kortov aparat i postupak ekstrakcije vlažnih uzoraka zemlje na prisustvo cista



(Globodera)



Posude za  
brojanje  
nematoda





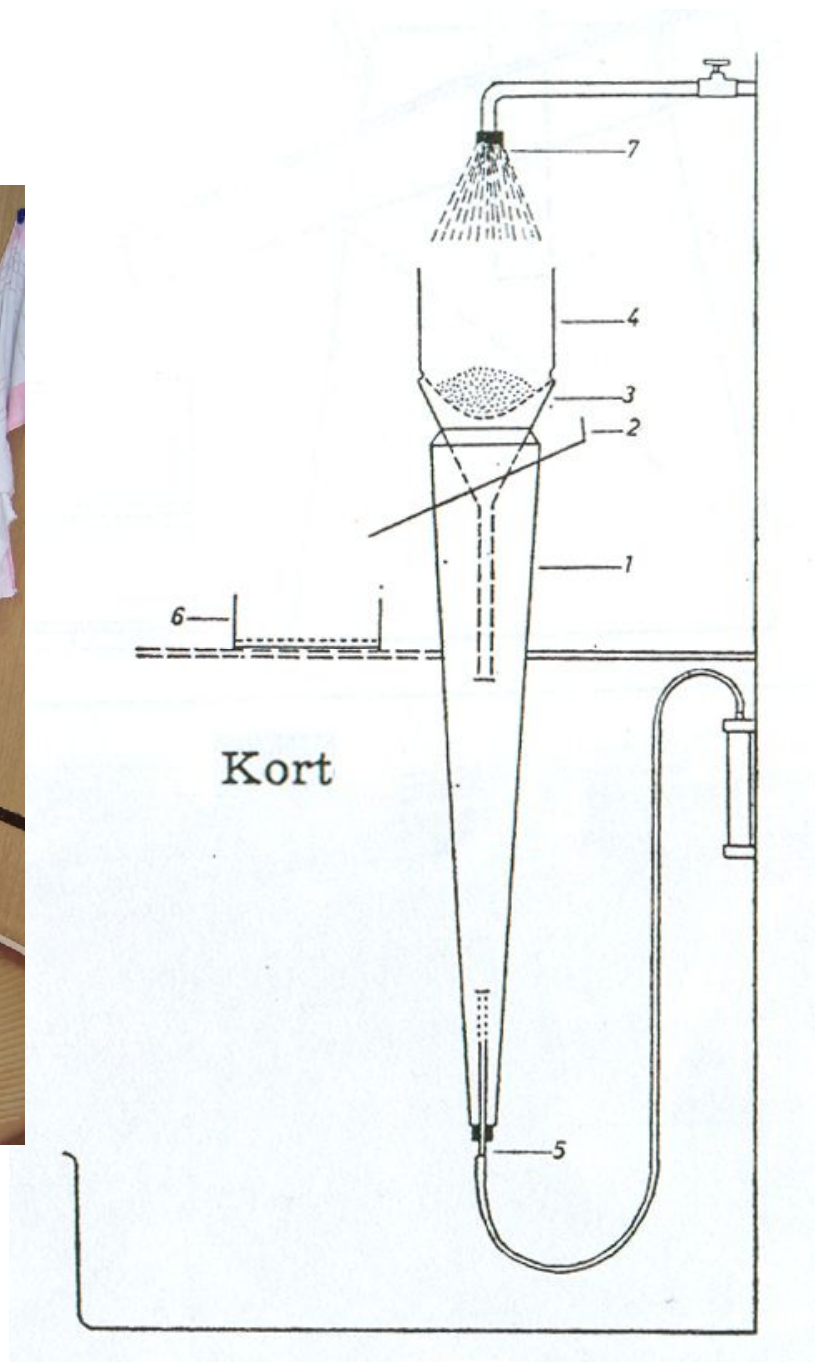
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# IV

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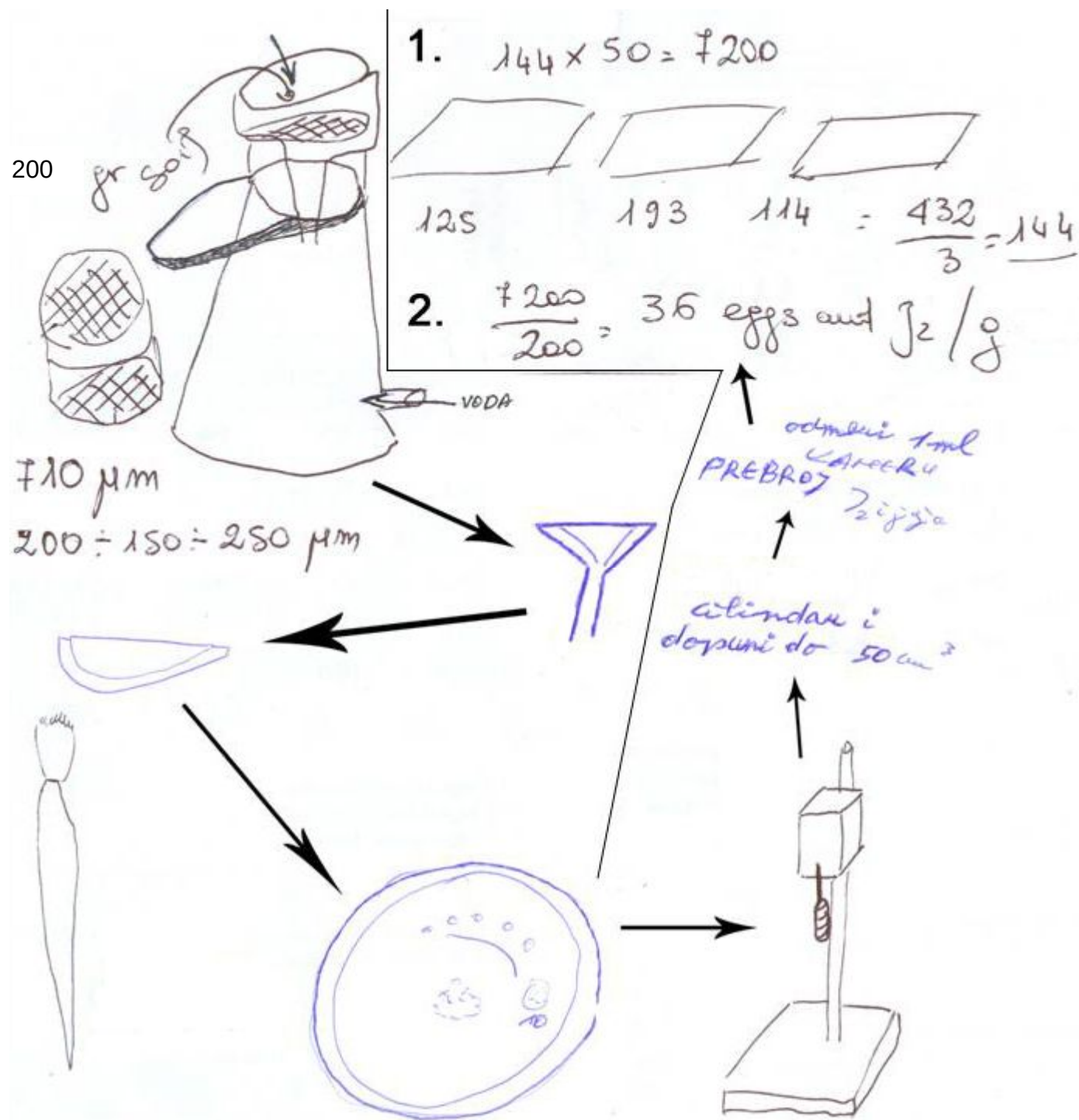
## Kortov aparat i postupak ekstrakcije vlažnih uzoraka zemlje na prisustvo cista



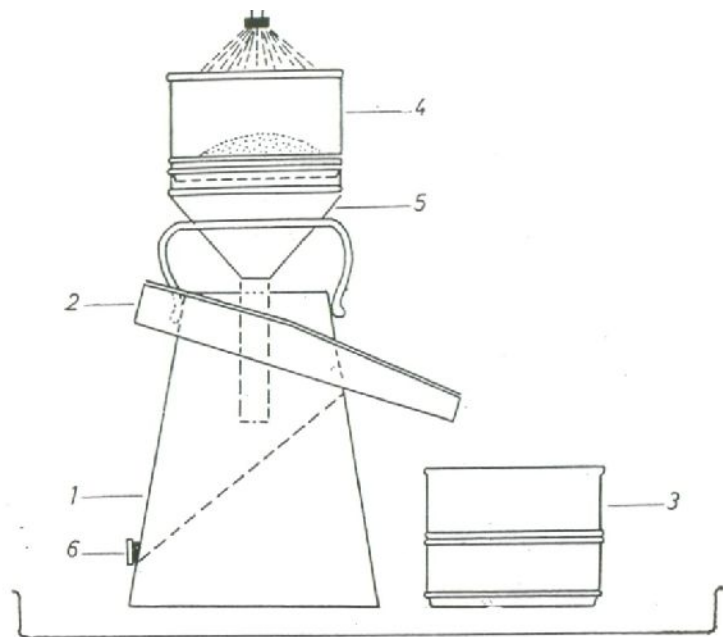
(Globodera)



Procedura pri  
 ekstrakciji cista i  
 proračun napada  
 po gramu zemljišta



## Feinwickov aparat i postupak ekstrakcije suvih uzoraka zemlje na prisustvo cista (Globodera)



Shematski prikaz Feinwickovog aparata za izdvajanje cista iz vazdušno suvih uzoraka zemljišta (gore) i serija aparata (dole).





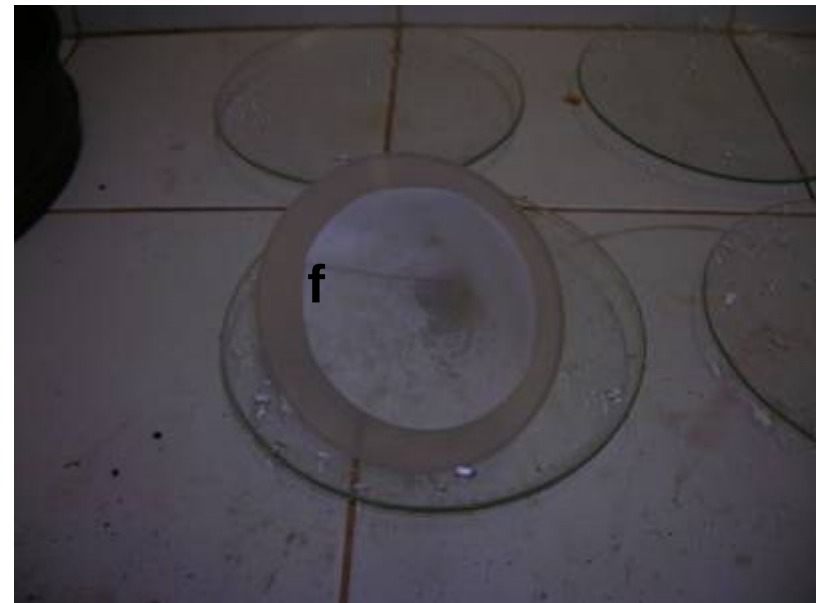
# Fenwick-ov metod (za izdvajanje cistolikih nematoda)

(Globodera)

1. Osušiti 200 g zemljišta na sobnoj temperaturi.
2. Staviti osušenu zemlju na sito koje se postavi na vrhu Fenwick-ovog aparata (a). Povezati aparat sa dotokom vode (b). Ispred aparata postaviti dva sita jedno na drugo od 710 and 200  $\mu\text{m}$  (c).



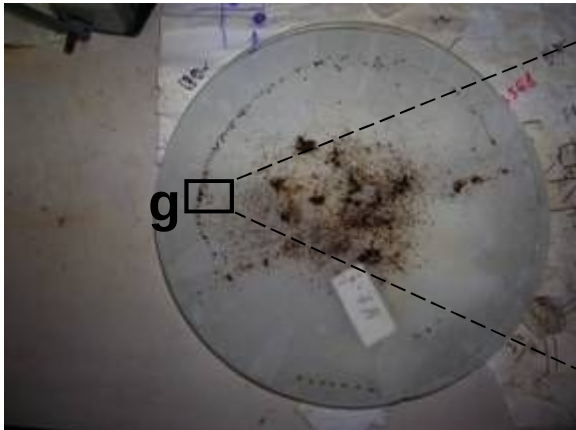
3. Vodom kroz gornje sito isprati zemlju i ciste u aparat. Voda koja iz dotoka ulazi u aparat stvara uzlaznu struju koja nije dovoljno jaka da podigne teže čestice zemlje, a jeste da podigne ciste. Ciste koje diže vodena struja izlaze kroz otvor (d), i padaju na sita (e).



4. Kroz sito 710 mikrometara ciste prolaze i hvataju se na sito 200. Odatle se lagano malim mlazom vode isperu na filter papir (f) postavljen na lijevak.



**5. Filter papir se pregleda pod mikroskopom i izdvajaju se ciste u grupice od po 10 (g). Da bi ih na kraju mogli lakše prebrojati.**





6. Sakupljene ciste mogu se sakupiti u plastičnu posudicu ili čašu, koja se do jedne trećine napuni vodom. A zatim se ciste posebnim aparatom (h) lome (i).
7. Na ovaj način dobija se smjesa oslobođenih jaja i larvi, koje se mogu prebrojati da bi se došlo do saznanja o eventualnoj budućoj brojnosti nematoda.



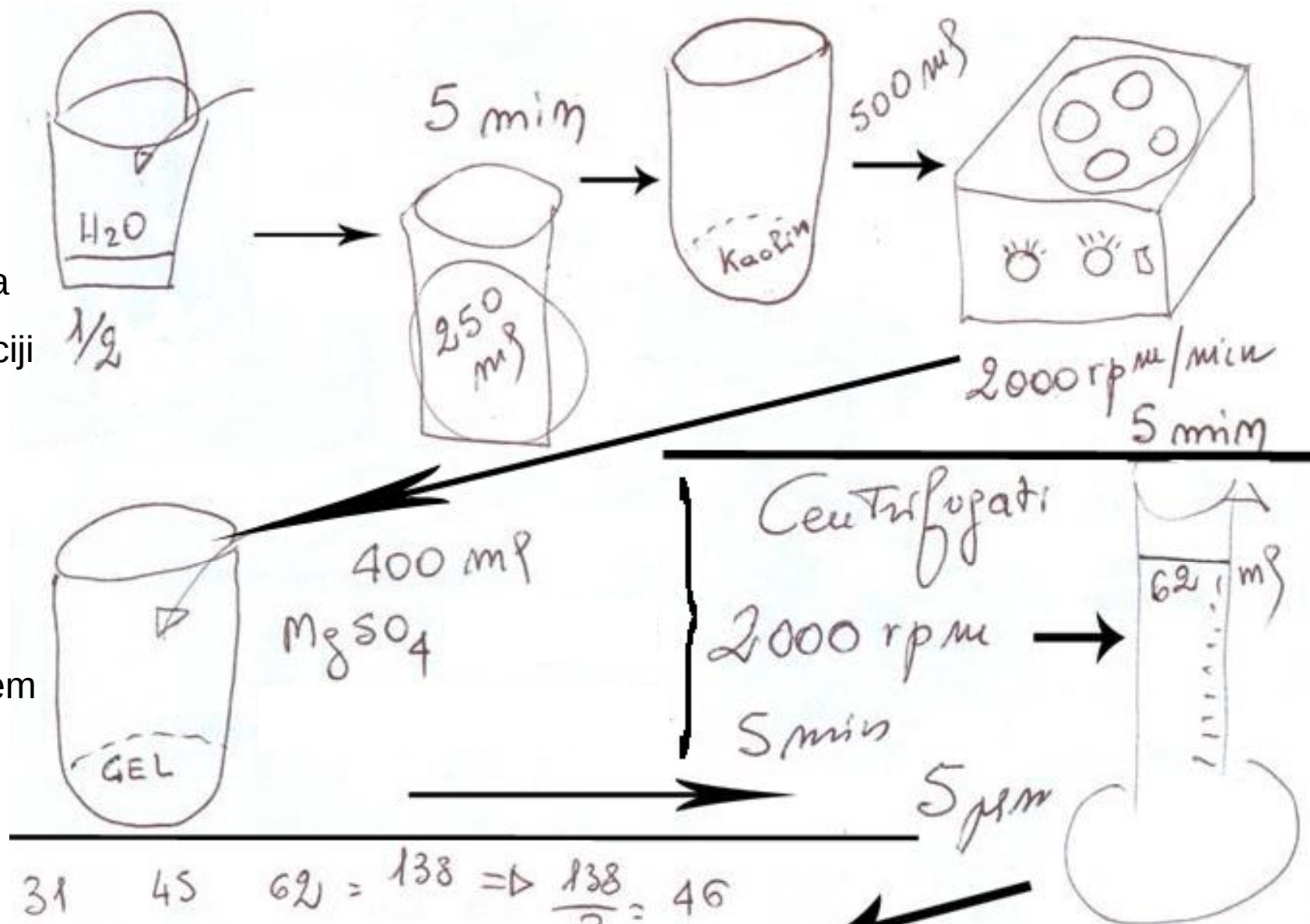


Laboratorija za  
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**V a**

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Procedura  
pri ekstrakciji  
vrsta i iz  
zemlje i iz  
biljnog  
materijala  
koriscenjem  
centrifuge



$$31 \quad 45 \quad 62 = 138 \Rightarrow \frac{138}{3} = 46$$

$$46 \times 62 = 2852 \text{ eggs and } \int_2 = 5,7$$

500



## Ekstrakcija nematoda iz zemlje korišćenje centrifuge





**Ekstrakcija nematoda iz zemlje korišćenje centrifuge**

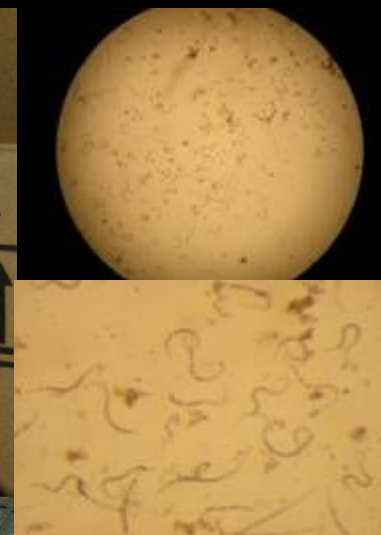
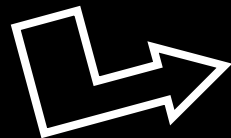




### Ekstrakcija nematoda iz zemlje korišćenje centrifuge







Ekstrakcija nematoda iz zemlje korišćenje centrifuge

## Ekstrakcija nematoda iz korijenovog sistema korišćenje centrifuge











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**v b**

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Izgled dijela laboratorije za procesuiranje uzoraka u MSU NemLab





Laboratorija za  
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# VI

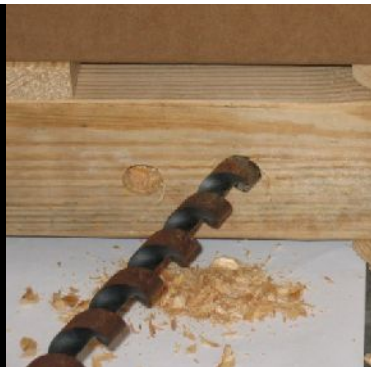
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Ekstrakcija *B. xylophilus* iz  
presjeka drveta i piljevine







Baermann –funnel



Monitoring na prisustvo Bursaphelenchus vrsta



**Uzorkovanje bušilicom**



**Odbačeno zbog uginuća nematoda pri uzorkovanju**

**Uzorkovanje sjekirom**





**Odstrani se kora**



**Uzimanje  
čipsa sa debla**





# Monitoring borovih šuma u Crnoj Gori na prisustvo *Bursaphelenchus* vrsta





## Ekstrakcija *B. xylophilus* iz drveta



Ekstrakcija

21 dan na temperaturi 21-23 stepena C





## Ekstrakcija *B. xylophilus* iz drveta



Priprema uzoraka



24 časa u vodi







24 časa na Baermanovim lijevcima



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# VII

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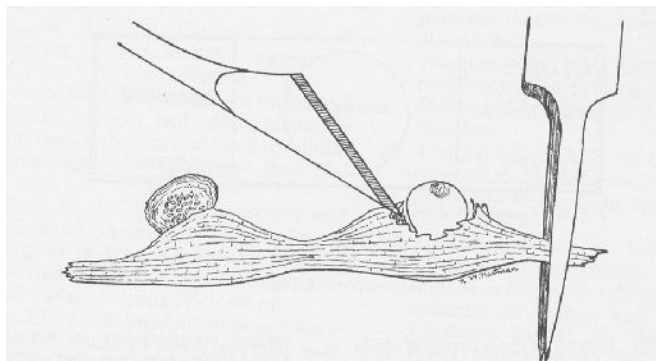


Fig. 1. Female being removed from root fragment.

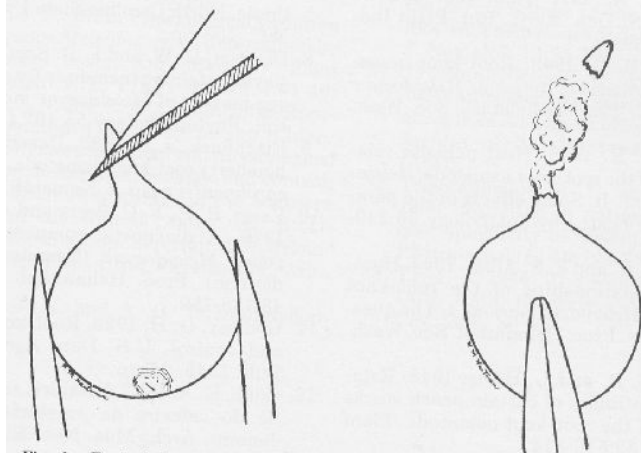
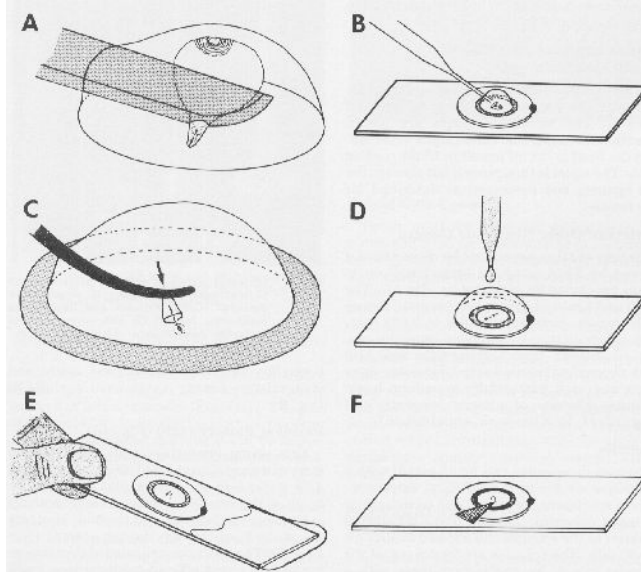


Fig. 2. Excised female being ruptured and body tissues gently removed.



# Procedura poslije estrakcije cista ili ženki Meloilogine vrsta

Odvajanje  
perenial pattern,  
odnosno zadnjeg  
dijela cisti, radi  
determinacije

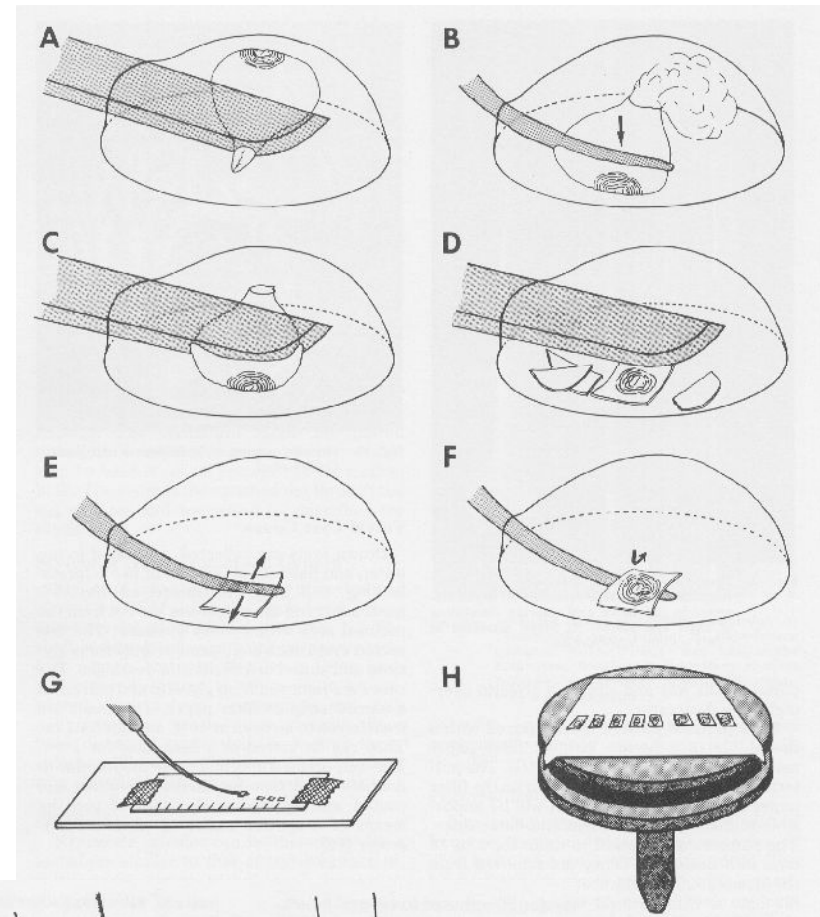


Fig. 3. Cuticle being trimmed from around the perineal pattern.

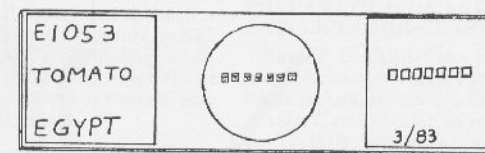
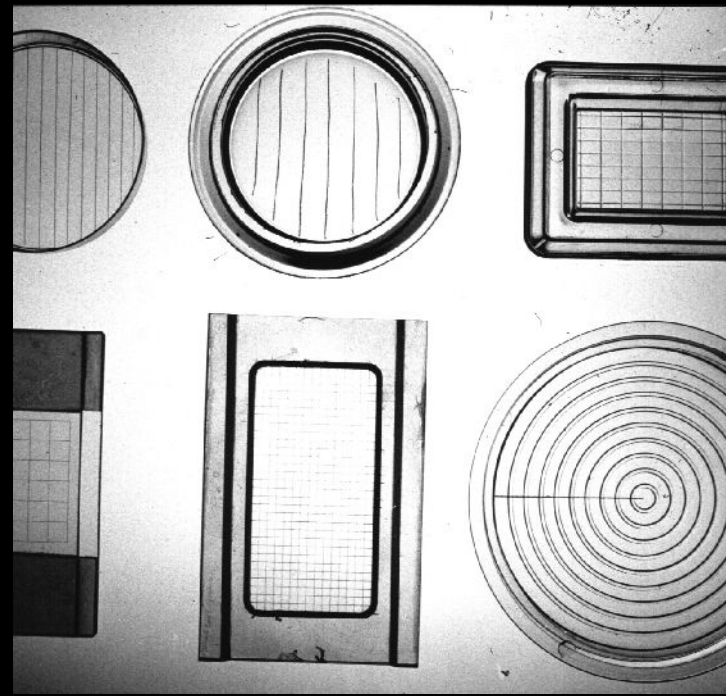
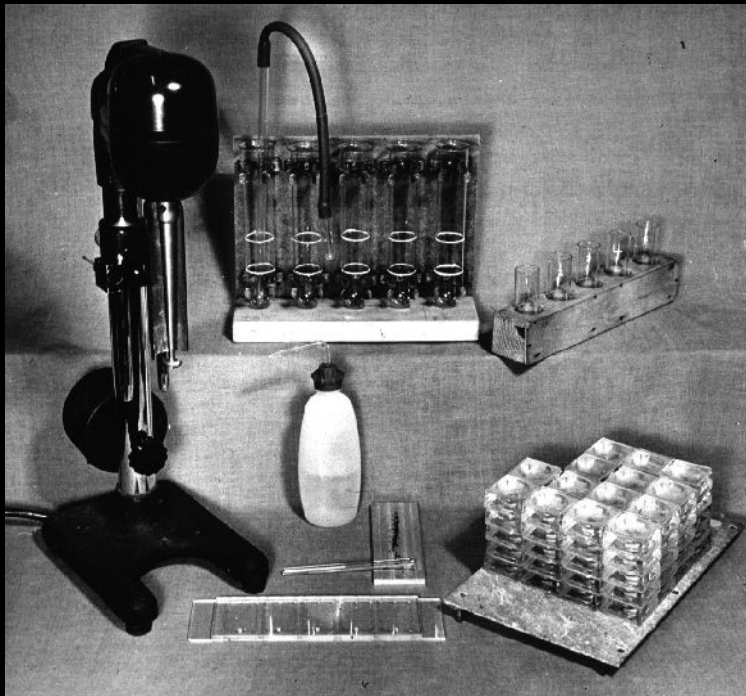


Fig. 4. Completed slide.



fiksiranje







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# Determinacija nematoda

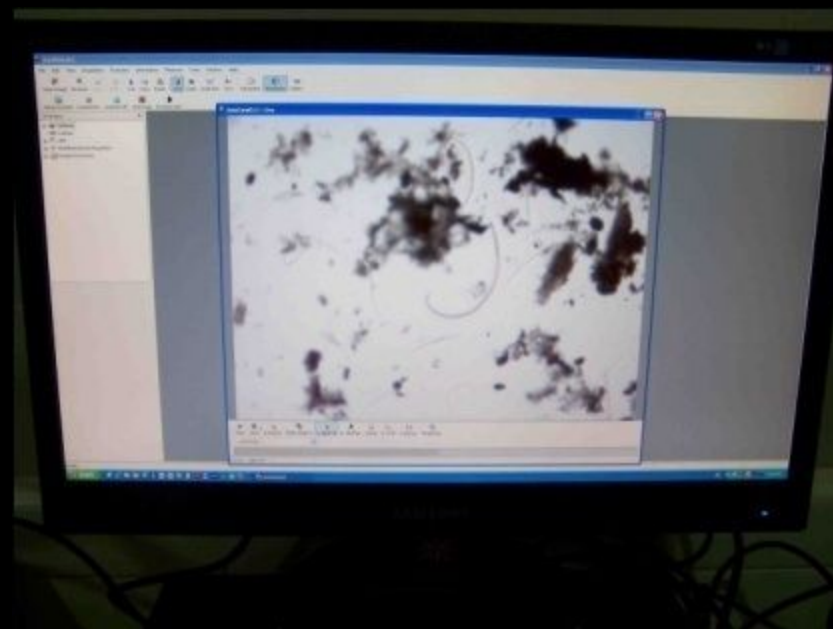
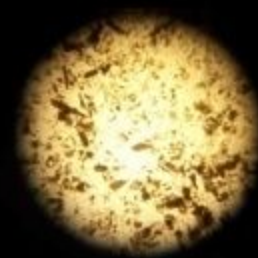
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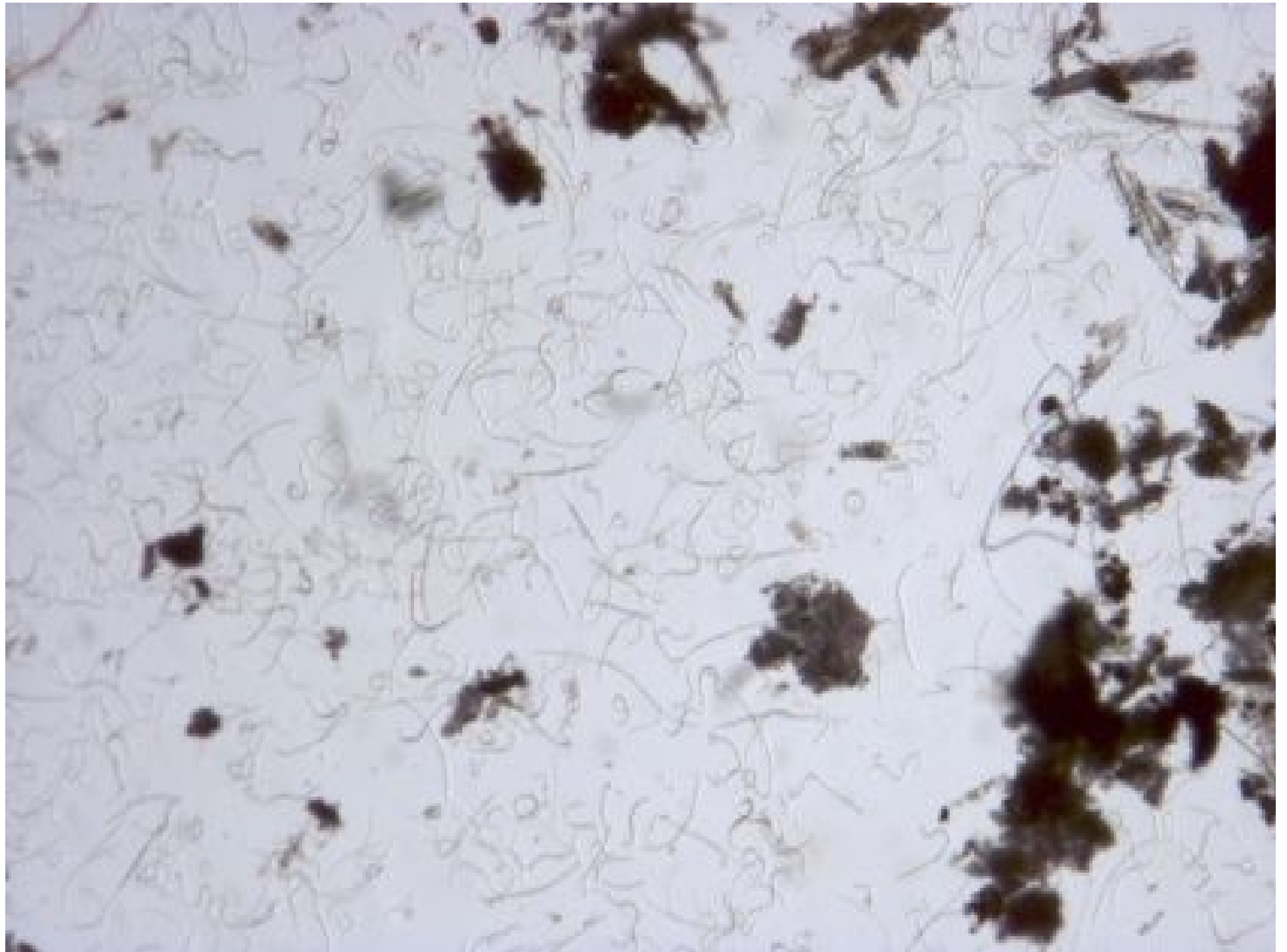


**Part of the Laboratory with  
microscopes and computers**















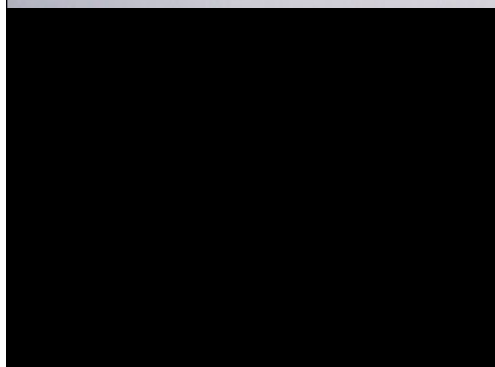








Oprema za rad na elektroforetskim reakcijama sa esterazom i malatdehidrogenazom kod ženki Meloidogyna





Rezultati elektroforetskih reakcija sa MDH i EST  
na pojedinačnim ženjkama iz plastenika u  
Zatsko-Bjelopavličkoj ravnici

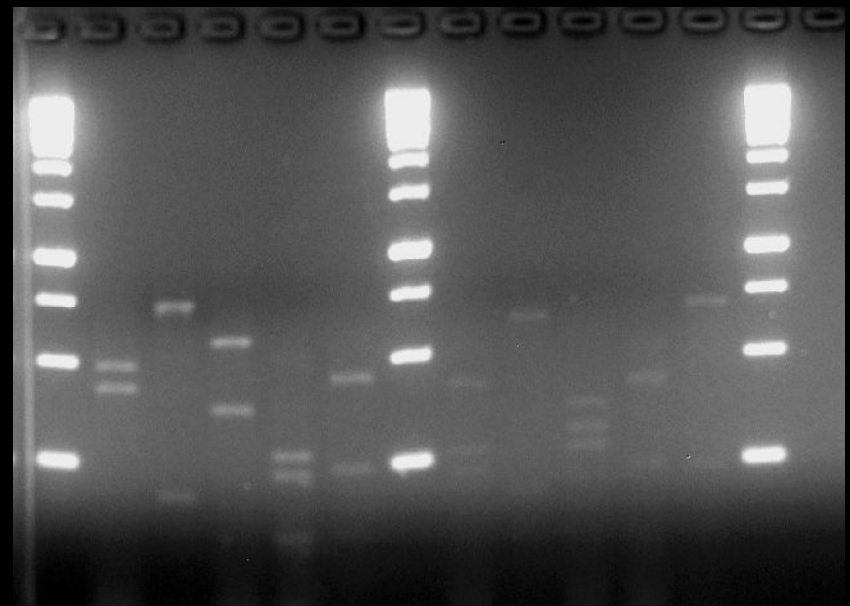
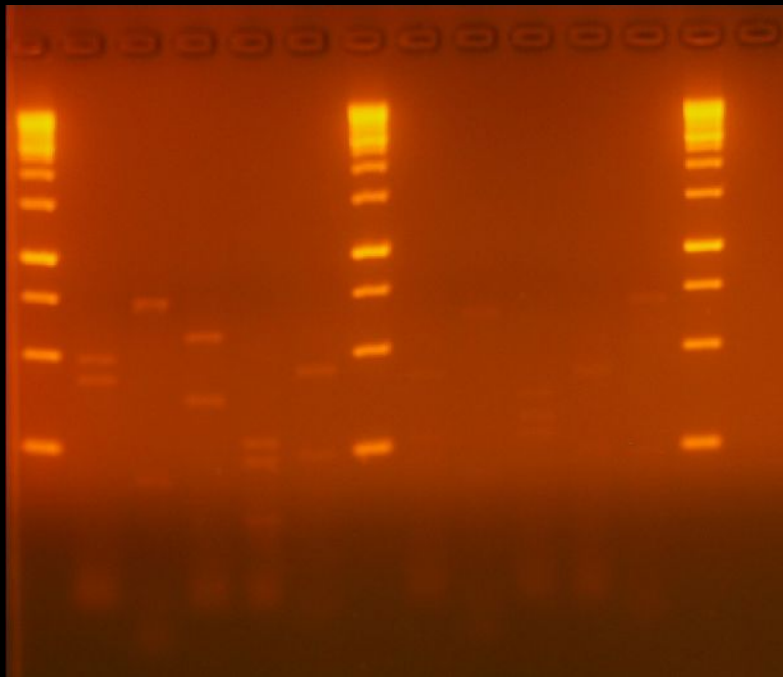
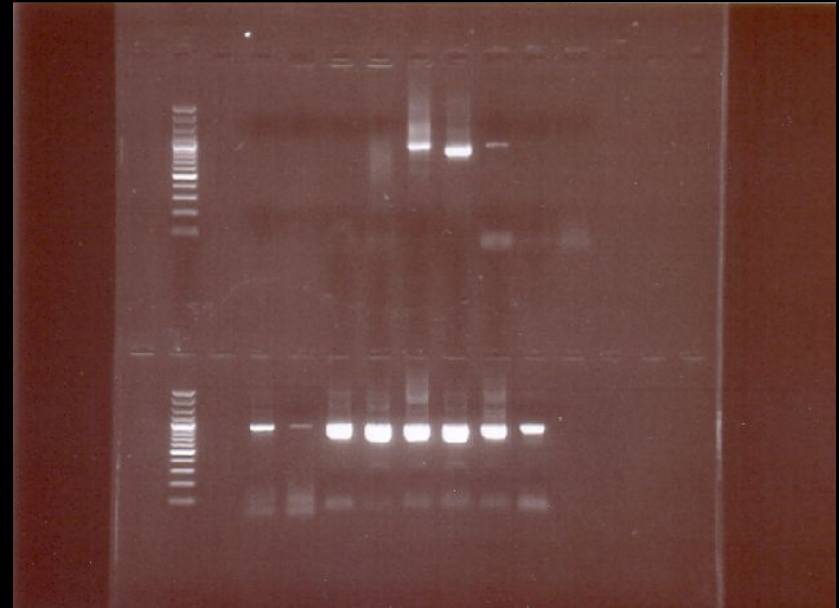
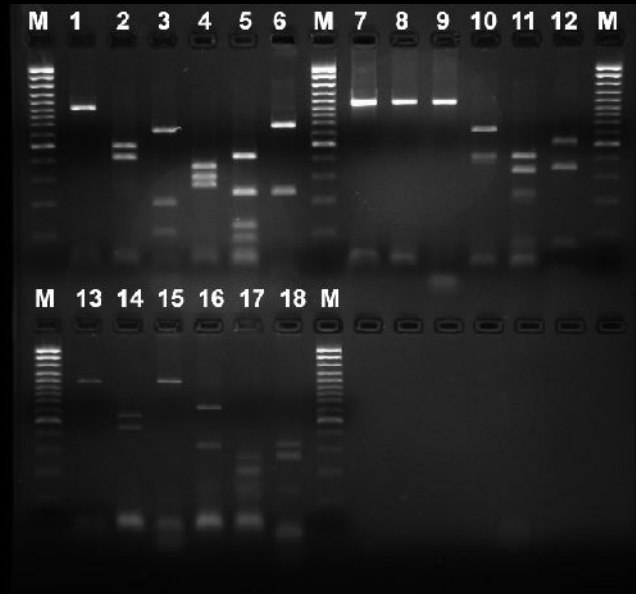
| <i>M.j.</i>     | 1, 2                | 3                  | 4                  | 5                   | 6, 7            |
|-----------------|---------------------|--------------------|--------------------|---------------------|-----------------|
| <i>kontrola</i> | <i>M. incognita</i> | <i>M. aronaria</i> | <i>M. javanica</i> | <i>M. ardonansi</i> | <i>M. hapla</i> |

malatdehidrogenaza

esteraza



## PCR metod detekcije *B. xylophilus*





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# Ekstra

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## Kalkulacija brojnosti nematoda u zemljištu i u korijenu

Međutim, ako smo unijeli u startu u tu posudu 12.000 jaja i L2 (10 jaja i L2 po 1 cm<sup>3</sup>) porast populacije je bio:

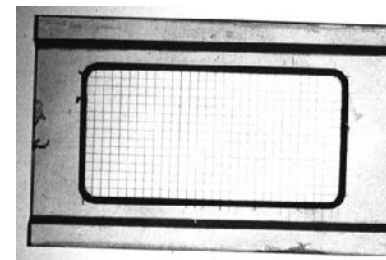
Imamo posudu sa 1.200 cm<sup>3</sup> zapremine zemljišta i iz te posude izdvojimo 9,82 g korijena ukupno i od toga odmjerimo 2,72 g.

Napravimo ekstrakciju i po ekstrakciji suspenziju razblažimo do tačno 1 l vode

Na “pločici” odredimo prosječno 70 jaja i L2 / 1 ml.

$$70 \times 1000 \text{ ml (1L)} = 70.000 / 2,72 = 25.735,29 \text{ jaja i L2 / g korijena}$$

$$25.735 \times 9,82 = 252.718 \text{ jaja i L2 na cijelom korijenu}$$



A iz zemljišta smo estrahovali i na “pločici” prosječno utvrdili na pr. 7,5 jaja i L2 u 1 cm<sup>3</sup> zemlje.

UKUPNA populacija je:

$$252.718 + (7,5 \times 1.200) = 261.718 \text{ nematoda ukupno u posudi, odnosno:}$$

$$261.718 / 1.200 = 218 \text{ jaja i L2 / cm}^3 \text{ zemljišta uključujući i korijenov sistem i samo zemljište.}$$

$$U = P_f / P_i \text{ (totalna populacija / inicijalna populacija)}$$

$$= 218 / 10 = 21,8 \text{ jaja i L2 po cm}^3 \text{ zemljišta sa korijenom je bio porast populacije.}$$





Međutim, ako sn

Imamo posudu  
odmjerimo 2,72

Napravimo eks

Na "pločici" odr

70 ›

25.7

A iz zemljišta sr

UKUPNA popul

252

261

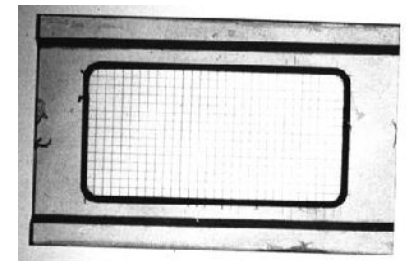
U



štu i u korijenu

rast populacije je bio:

ena ukupno i od toga

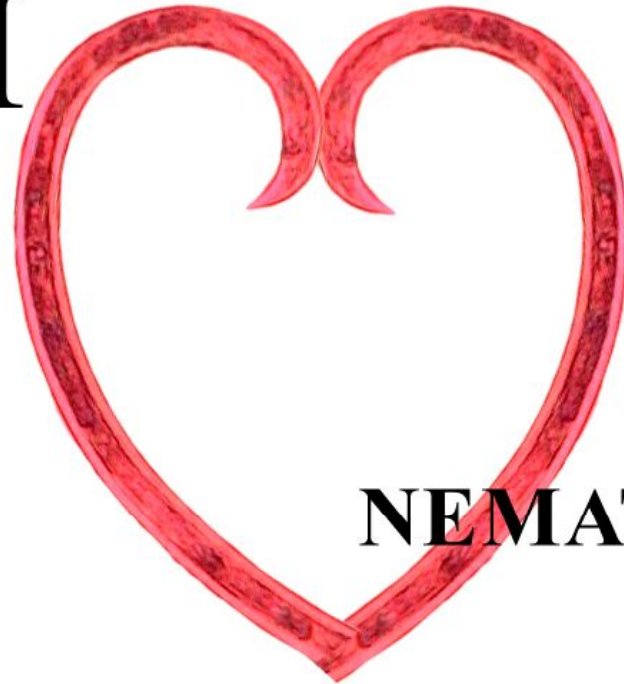


<sup>3</sup> zemlje.

i samo zemljište.

o porast populacije.

I



**NEMATODE**

**HVALA NA PAŽNJI**