

# STANDARD AND SPECIFICATIONS FOR TREE REVETMENT



## **Definition**

A tree revetment consists of a tree trunk and branches, without root wad, cabled to an earth anchor, which is buried in the streambank.

## **Purpose**

To reduce streambank erosion by absorbing energy and reducing velocity, capturing sediment, and enhancing conditions for planting or colonization of native species.

## **Conditions Where Practice Applies**

This practice is appropriate for streambanks that are eroded or undercut. It should not be used near bridges or other structures where there is a potential for downstream damage if a revetment dislodges. Their use should be limited to non-flashy streams where the needs for future maintenance are not important.

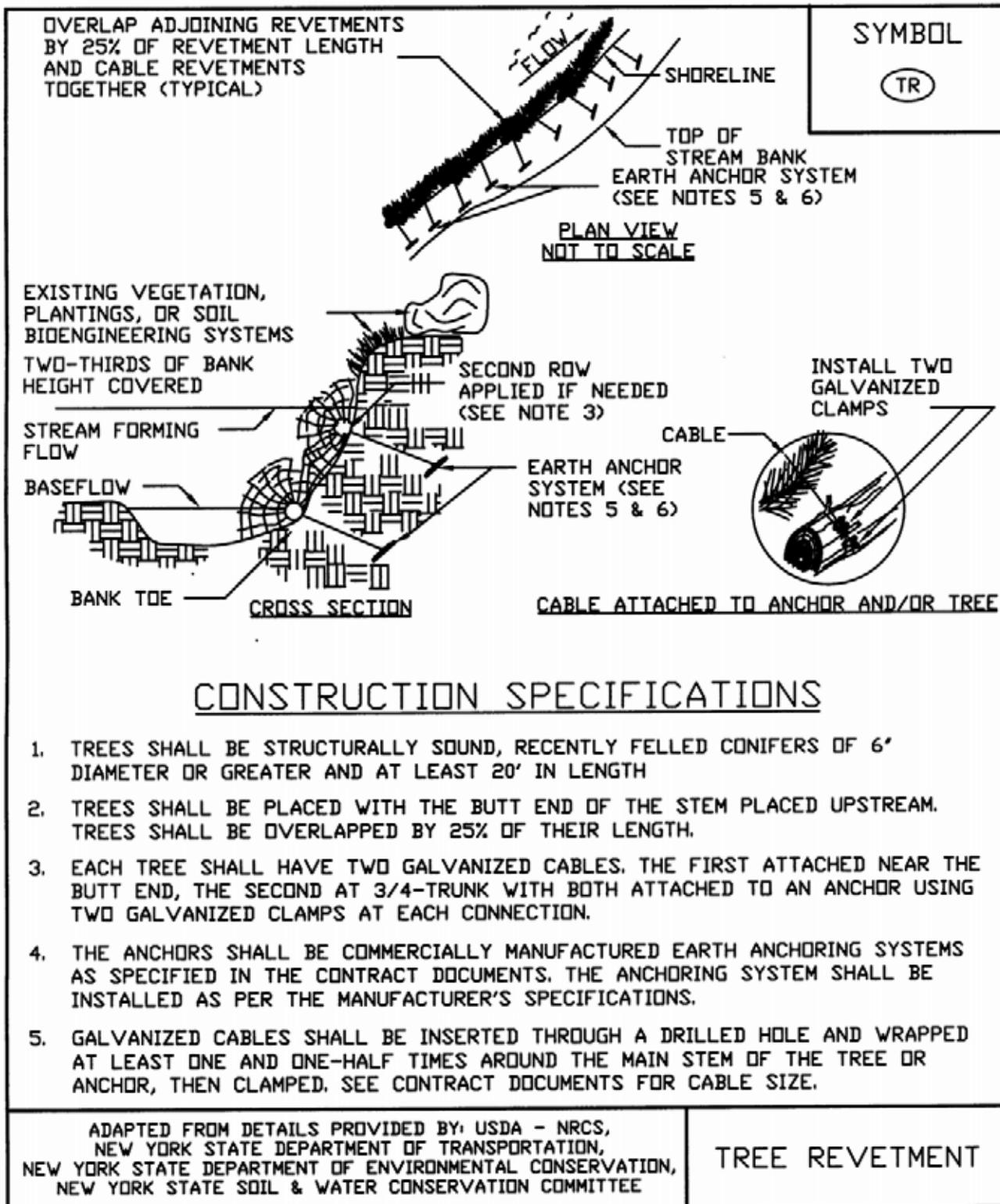
## **Design Criteria**

1. Trees shall be sound, recently felled spruce or fir of 6" or greater diameter and at least 20 feet in length.
2. Trees are placed initially at the base flow elevation with the butt end upstream. Multiple tree revetments shall be overlapped by 25% of their length, working from downstream to upstream.
3. Each tree shall have their branches trimmed off on the bank side and have two anchors, one near the butt end and the other at 3/4 distance up the trunk.
4. The tree shall be fastened with galvanized cable to the anchors, which will be commercially manufactured earth anchoring systems. The butt end cable shall also be attached to the stem of the next tree at 3/4 the distance from the base, as it is placed to the outside of the previous tree.
5. Excavate and backfill as necessary to fit the tree revetment to the site.

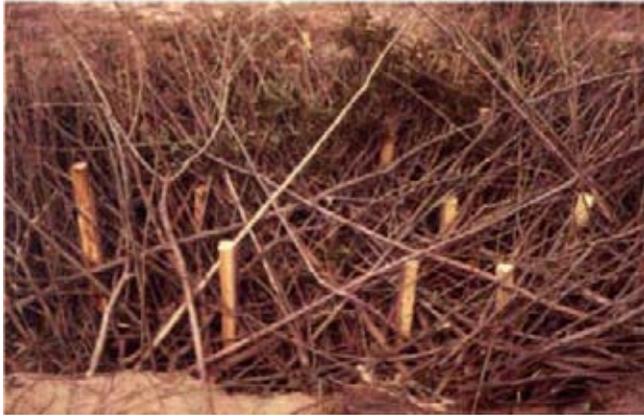
## **Maintenance**

Due to the susceptibility of plant materials to the physical constraints of the site, climate conditions, and animal populations, it is necessary to inspect installations frequently. This is especially important during the first year or two of establishment. Plant materials missing or damaged should be replaced as soon as possible. Sloughs or breaks in drainage pattern should be reestablished for the site as quickly as possible to maintain stability.

**Figure 4.7  
Tree Revetment**



# STANDARD AND SPECIFICATIONS FOR BRANCPACKING



## **Definition**

Branchpacking consists of alternate layers of live branch cuttings and tamped backfill to repair small, localized slumps and holes in slopes.

## **Purpose**

The purpose of branchpacking is to provide repair to existing slopes that have small slips or slumps by filling in the failed area with plant materials and soil.

## **Conditions Where Practice Applies**

This is an appropriate technique for repairing slip areas that do not exceed 4 feet deep or 6 feet wide. It should not be used as a slope stability measure if structural embankment support is needed.

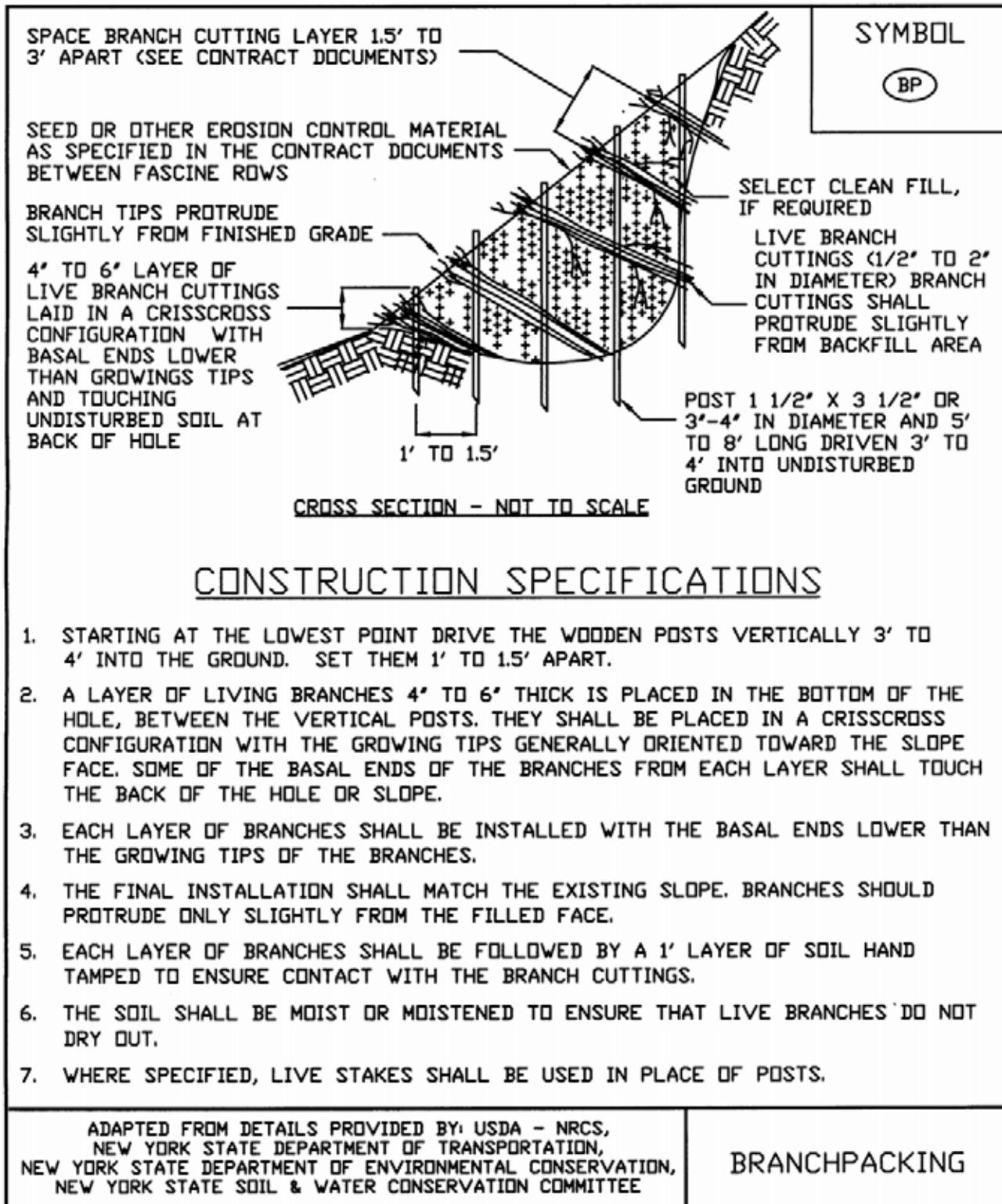
## **Design Criteria**

1. The live branch cuttings shall be 1/2 - 2 inches in diameter and long enough to touch the undisturbed soil at the back of the area to be repaired. They should extend 4 - 6 inches beyond the finished backfill grade.
2. Wooden posts should be used to secure the plant material in place. They should be 6 - 8 feet long and 3 - 4 inches in diameter. If lumber is used, it shall be a minimum standard two by four.
3. Wooden posts shall be driven vertically 3 feet deep and placed in a grid pattern 1 - 2 feet apart.
4. Beginning at the bottom of the slip area, 4 - 6 inch layers of live branch cuttings are placed in angled layers, 1.5 to 3 feet apart. Compacted moist soil is placed between the layers (see Figure 4.8).

## **Maintenance**

Due to the susceptibility of plant materials to the physical constraints of the site, climate conditions, and animal populations, it is necessary to inspect installations frequently. This is especially important during the first year or two of establishment. Plant materials missing or damaged should be replaced as soon as possible. Sloughs or breaks in drainage pattern should be reestablished for the site as quickly as possible to maintain stability.

**Figure 4.8  
Branchpacking**



# STANDARD AND SPECIFICATIONS FOR FIBER ROLL



## **Definition**

A fiber roll is a coir (coconut fiber), straw, or excelsior woven roll encased in netting of jute, nylon, or burlap.

## **Purpose**

To dissipate energy along streambanks, channels, and bodies of water and reduce sheet flow on slopes.

## **Conditions Where Practice Applies**

Fiber rolls are used where the water surface levels are relatively constant. Artificially controlled streams for hydropower are not good candidates for this technique. The rolls provide a good medium for the introduction of herbaceous vegetation. Planting in the fiber roll is appropriate where the roll will remain continuously wet.

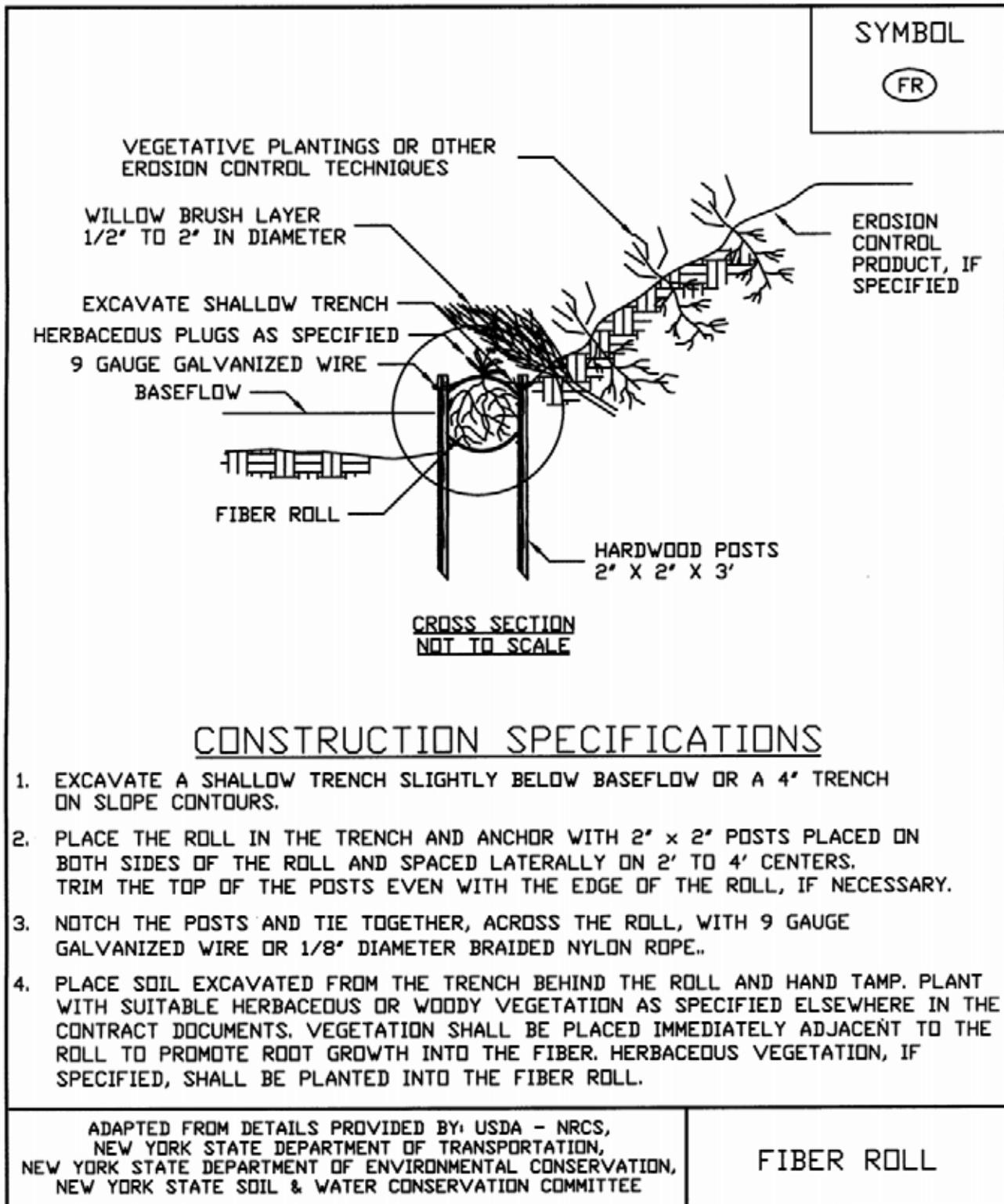
## **Design Criteria**

1. The roll is placed in a shallow trench dug below baseflow or in a 4 inch trench on the slope contour and anchored by 2" x 2", 3-foot long posts driven on each side of the roll (see Figure 4.9).
2. The roll is contained by a 9-gauge non-galvanized wire placed over the roll from post to post. Braided nylon rope (1/8" thick) may be used.
3. The anchor posts shall be spaced laterally 4 feet on center on both sides of the roll, staggered, and driven down to the top of the roll.
4. Soil is placed behind the roll and planted with suitable herbaceous or woody vegetation. If the roll will be continuously saturated, wetland plants may be planted into voids created in the upper surface of the roll.
5. Where water levels may fall below the bottom edge of the roll, a brush layer of willow should be installed so as to lay across the top edge of the roll.

## **Maintenance**

Due to the susceptibility of plant materials to the physical constraints of the site, climate conditions, and animal populations, it is necessary to inspect installations frequently. This is especially important during the first year or two of establishment. Plant materials missing or damaged should be replaced as soon as possible. Sloughs or breaks in drainage pattern should be reestablished for the site as quickly as possible to maintain stability.

**Figure 4.9  
Fiber Roll**



## References

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1. Gray, Donald H. and A.T. Leiser. 1982. Biotechnical Slope Protection and Erosion Control. Van Nostrand Reinhold Company. New York.
2. Dickerson, John A. and D.W. Lake, Jr. 1989. ASAE Paper No. 892 654. Cost Effective Biotechnical Slope Protection Trials in New York.
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4. Dickerson, et. al. 1990. ICEA paper. Obtaining Plant Materials for Biotechnical Work.