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Portable Equipment for Netting on Stony Ground or other Hard Surfaces

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ABSTRACT

Stony ground or other hard surfaces can make it difficult to erect mist nets because nothing can be driven into the ground. Here, I describe equipment that can be used to erect nets quickly in such situations. The equipment is portable and constructed of materials that are widely available. A plywood rectangle with a flange and pipe nipple attached at its center acts as a base to support each pole. Poles consist of two sections of electrical conduit joined by a connector fashioned from a short section of polyvinyl chloride (PVC) tubing. This connector can have one or more guy lines attached to its center. Stones can be used to weight the bases as well as anchor guy lines to stabilize the net. This equipment is well suited for situations requiring only a single net at locations reached best by walking but can be of value wherever rocks or hard surfaces exist.

INTRODUCTION

Banders have devised numerous systems to support mist nets in a variety of situations. For example, Barrentine (1984) described techniques for supporting nets from bridges and over water. Humphrey et al. (1968) and Albanese and Piaskowski (1999) described techniques for elevating nets to catch birds in the forest canopy. Several authors have described various materials for use as mist net poles along with several ways to connect pole sections (Collins 1976, Castrale and Karr 1981, Jackson and Schardien 1982, Keyes and Grue 1982, Trichka and Varza 1982, Sims 2004). Many systems rely on stakes or rebar driven into the ground to support poles or anchor guy lines. However, it is difficult or impossible to sink anything into frozen ground, rock outcroppings, or soil containing abundant stones. Neel and Neel (1963) described cast cement blocks to support poles in these situations, but these 45-pound [20.4 kg] blocks are too heavy to be easily portable. Frazier (1964) developed far lighter bases (<1 lb

[0.45 kg]) to support poles that can also be easily disassembled for transport. However, the central component of these bases is a metal fitting that is relatively expensive (currently \$18 each not including shipping) and difficult to source locally. Here, I describe a system for use on stony or frozen ground that is both portable and constructed from materials found in most hardware and home improvement stores. Some of the components could also be made from scraps obtained for free. This equipment allows rapid set-up of nets and is particularly well suited for situations requiring a single net at sites best reached on foot.

DESCRIPTION OF EQUIPMENT

The system consists of bases, pole sections, and connectors. Each base is a simple rectangle of $\frac{3}{4}$ " [1.9 cm] plywood (Fig. 1). A metal flange is attached to the center of this rectangle with screws and a 6" [15.2 cm] pipe nipple (a short section of pipe threaded at one or both ends) is threaded into it. The exact size of the plywood rectangle is not critical. I use a rectangle 12" x 15.5" [about 30 x 40 cm] because this represents a good compromise between being large enough to support a pole and small enough to be easily carried. The exact diameter of the pipe nipple depends on the diameter of the mist net poles used. I use $\frac{1}{2}$ " [1.3 cm] electrical metal tubing (EMT) for poles which slides easily inside a $\frac{3}{4}$ " [1.9 cm] pipe nipple. For larger diameter poles, it would only be necessary to select an appropriately larger diameter pipe nipple and flange. However, larger metal parts would make the base heavier.

Poles for this system consist of two 5' [152 cm] lengths of EMT which are joined by a connector. The connector is a 12" [30 cm] section of $\frac{3}{4}$ " [1.9 cm] polyvinyl chloride (PVC) tubing with a guy

line attached midway along its length (Fig. 2). I leave a single 9' [about 275 cm] guy line attached permanently to each connector and wrap this cord around the PVC for storage or carrying in a backpack. One simple way to attach the guy line to the tube is to drill a hole through the tube, insert a 1.5" [3.8 cm] cotter pin through it, and then bend the ends of the pin so that it cannot slide out of the hole. The rounded head of the cotter pin does not provide much of a space for attaching rope, but a keyring attached to the cotter pin provides ample room for one or more lines. Alternatively, one can screw an eye bolt into the drilled hole to serve as a guy line anchor point. I recommend smoothing over the bent ends of the cotter pin with caulk or epoxy to prevent windblown netting from snagging on it. If you use an eye bolt, simply thread it into the PVC only far enough so that its end does not protrude.

The sizes of PVC tubing are based on outside diameter and the thickness of its plastic walls depend on the maximum water pressure the tube is rated to withstand. Half-inch [1.3 cm] EMT slides easily inside two varieties of $\frac{3}{4}$ " [1.9 cm] PVC tubing designated "Schedule 40" and "Schedule 80" and marked as such repeatedly at intervals along the outside of the tubing. Although both varieties work well, the thicker-walled Schedule 80 fits $\frac{1}{2}$ " [1.3 cm] EMT more snugly whereas Schedule 40 is a little loose. Some PVC tubing is molded in gray rather than white and this will not need to be painted to blend in with the environment.

USING THE EQUIPMENT

Two bases, two connectors, and four pole sections are needed for setting up one net. Erecting a net can be accomplished quickly. Once a lane is prepared by trimming vegetation and any needed rocks are gathered, I can set up or take down a net by myself



Figure 1. A base constructed from plywood, a flange, and metal pipe nipple for supporting a net pole.

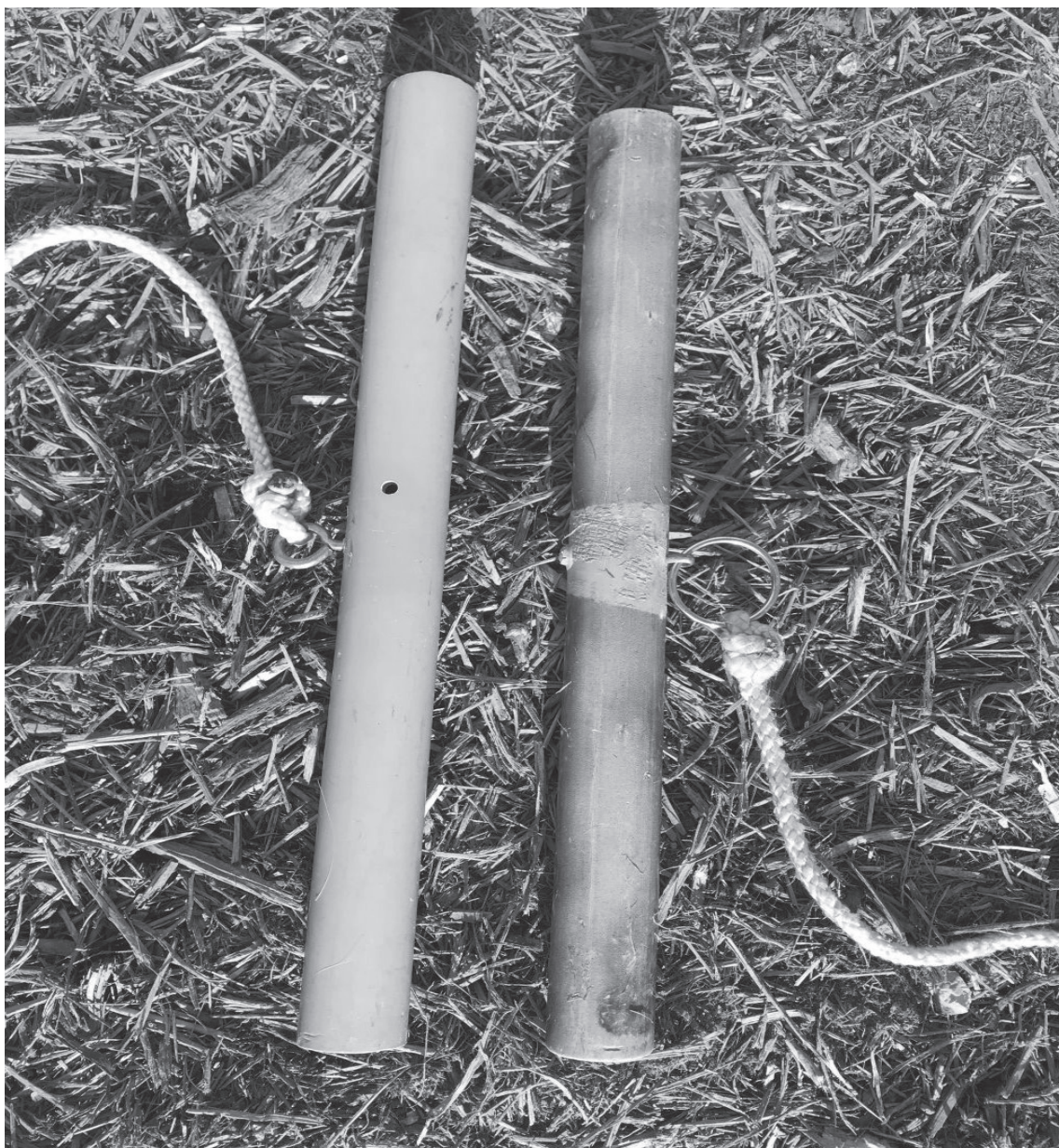


Figure 2. PVC connectors for joining sections of electrical metal tubing to form a net pole. Each has a single guy line attached. The guy line of the one on right is tied to a keyring which is attached to the PVC tube with a cotter pin. The lower connector depicted on the left has its guy line tied to an eyebolt.

in approximately 6 min. Also I can easily carry all the equipment needed for a single net.

To facilitate carrying, I secure the poles into a bundle using two bungee cords with plastic balls on their ends. These “ball bungees” are also widely available in hardware and home improvement stores. I carry the connectors in a backpack along with the mist net and banding tools. To carry a pair of bases, I place them with their bottom sides together and carry them at my side supported from below by my hand in the same manner one might

carry a large book. Held in this way, the inward-facing pipe nipple extends across front of my body at the bend where leg and hip meet where it will not interfere with walking. I have carried this equipment as far as a mile over steep, rocky terrain with relative ease in this way.

Guy lines can be anchored to trees, bushes, or stones. If a stone is used, it needs to be at least the approximate size of a loaf of bread to provide sufficient weight. If enough soil is present near one end of the net, one can also anchor to a tent

stake, but then it is necessary to carry stakes and a hammer. Where larger rocks are unavailable, it is also possible to improvise an anchor using a collection objects each of which are too small to work alone. For example, one can wrap the line around two rocks that together provide sufficient mass for an anchor. I sometimes anchor the line to a fallen tree branch, then pile many small rocks on and around the branch to hold it firmly in place. It is necessary to take precautions when using a single guy line to prevent the wind from blowing the whole setup over. First, position the bases so that their long axes are perpendicular to the net. Then place stones or other weights on the bases. Although it is possible to attach two guy lines to a connector, only one is necessary if the base is weighted sufficiently. Another difficulty is that the bases can be unstable on uneven ground. To prevent them from rocking, wedge small stones or sticks under the appropriate corners of the base to act as shims. It is often necessary to use this same technique to level a base and prevent the pole from leaning. When the guy line is anchored to a rock, adjusting tension on the rope is easily accomplished by simply sliding the rock toward or away from the base.

The guy line blocks movement of the net's loops up and down the pole past the middle of the connector, thus limiting the extent that one can raise or lower the net. However, most problems can be avoided with proper setup. For most banders, the best arrangement of the net's loops is to have three on the pole above the guy line and two below. For short banders who may need to lower the net farther to remove birds caught in the top panel, three loops below and two above may work better.

This system was originally created for short duration, single net, targeted capture attempts of territorial birds. It works well in that situation, but has many other useful applications. For example, it allows you to set up a net indoors to capture a bird trapped in a building or to work on net repair out of the weather. I frequently use it to check the condition of a net by quickly setting it up in the parking lot outside my office. The parking lot is a

good place for beginners to practice setting up nets before attempting it in the field and this equipment makes that early instruction easy. I have also found the equipment useful for deploying nets across the ends of culverts to capture swallows or phoebes nesting within. These culverts often have concrete flooring or rocky stream beds that make it impossible to anchor poles or stakes into the ground.

The bases or connectors can also be used in combination with other netting systems. For example, the bases can be made to support other kinds of poles. The connectors can be used without the bases as a simple means to join portable poles. I often use them in this way when I need to transport equipment in my car when banding away from home.

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