A SWARM TRAP ON EVERY TREE

by Dr. Leo Sharashkin*

There are many swarm trap models, and even an empty carton can catch you a swarm. But if you rely on swarms for starting and increasing your apiary and use them as a natural alternative to splits and requeening, the conventional swarm traps have their shortcomings.

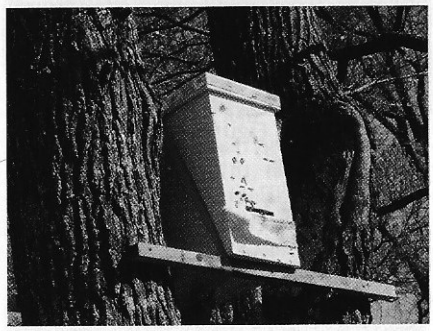
The commercially available **wood pulp swarm traps**, which look like flowerpots, require frequent checking (or the bees will build comb right in the trap). They are too small, not durable, and quite expensive for such a short-lived contraption.

Nuc boxes are too small to be effective, with too small of an entrance, and usually require a special rack to install.

Deep Langstroth boxes are the right size, but also require a rack because of their shape. Besides, you need ten frames to fully equip each deep box, so if you hang dozens of traps, that's a lot of equipment tied up in the swarm-catching adventure. Deeps are also too wide to comfortably carry up and down the ladder with one hand.

All things considered, if you only need a few traps, deep bodies are the way to go. Old boxes from healthy colonies work best: both their smell and propolis deposits are attractive to swarms. Make sure to give it a telescoping top to keep elements out. You would not move into a damp apartment with a leaky roof, would you?

But catching swarms can be addictive. I am a living witness to that, with some 40 swarm traps ready to be set out in the spring. (And in case you are starting to wonder, I do have a job, a family with four kids, and a farm to take care of.) I use the model proposed by Fedor Lazutin in *Keeping Bees With a Smile*, with a number of modifications. For me it fills the bill for an ideal swarm trap and I've had similar feedback from others who use it. This past season my neighbor built 12 boxes like that and caught 11 swarms. My success rate of 50% looks lame compared to that!



A good swarm trap is all you need to get some free bees and to tap into the genetic diversity of local feral bee populations, some of which may be mite- and disease-resistant. CREDIT: *Mike Moore, Arkansas*

All I want in a swarm trap

Here is my wish list for an ideal swarm trap, and this model delivers:

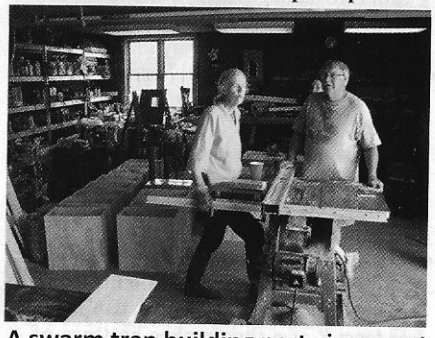
- **The right size** — between 40 and 60 liters (10 to 15 gallons or 1.5–2 cubic feet). Numerous researchers demonstrated this is the size preferred by scout bees and most often occupied by swarms. The swarm traps I build are 53 liters. Ten-frame Langstroth deeps are 43 liters — good! Nuc boxes are only 23 liters, but you can connect them in twos to obtain 46 liters. A ten-frame Langstroth medium super is 29 liters, and an 8-frame — 24 liters.
- **Entrance** — 2 square inches — mimicking the size of entrances commonly found in natural tree hollows. I cut a bird-proof slit entrance 1/2" high and 4" long.
- **Lightweight** — 15 lbs or less. You'll be scaling trees with it! So it should be light enough to hold safely with one hand while climbing up and down the ladder.
- **Durable** — to last ten years or more. Swarm trap success rate increases with age. The more swarms you catch in it, the more pheromones linger in the box, making it ever more attractive to new swarms. I dropped mine from the tree with zero damage (don't stand under the ladder!), and no marauding squirrel was ever able to scratch its way into the box.
- **Weather-tight** — should not let any rain in. Damp swarm traps are rarely accepted by bees. This means I need a telescoping cover in my climate. Migratory covers or nuc-box-style covers did not prove reliable under heavy rains.
- **Economical** — it costs only $15 to build using materials available from any building supply store. Building at least 8 at a time makes best use of plywood.
- **Easy to build** — accessible to someone without woodworking skills or power tools. I use electric tools to speed things up (1 hr per trap), but this model can also be built with a handsaw, a hammer, and a screwdriver (2 hr per trap).
- **Taller than it is wide** — this shape is convenient to carry under one arm and easy to attach to the tree with ratchet straps, requiring no additional racks.
- **No rack required** to attach it to the tree.
- **Infrequent visits** — it can be checked every 2 to 3 weeks, and the bees won't run out of space. This is especially important when the traps are spread over a large area and require a bit of driving to get to.
- **Easy transfer** of swarms into permanent hives — which means the trap has to have frames.
- **Accepts standard frames** — for the same reason of compatibility and ease of transfer into the hive.
- **Accept extra-deep frames** — e.g., the old Dadant brood frames 11-1/4" deep or even Lazutin frames 18-1/2" deep. For me it is important because I run several hives with these extra-deep frames.
- **Cheap to equip** — requires a minimal number of frames. This trap takes only

* **All photos and drawings by Leo Sharashkin, except where noted.**

six frames; that is 40% less than a 10-frame box. I use foundationless frames, saving the cost of foundation and the time it would take to install.

- **Scout bee friendly** — Thomas Seeley describes in *Honeybee Democracy* how scouts measure the cavity's volume to determine if it is large enough to house the colony. They walk on the walls and fly from one wall to another. If the box is fully filled with empty frames, it could give impression of smaller volume. This model has almost 60% of the volume free of frames, and should feel like a spacious dwelling.

My father, who helped me build a batch of my first-generation traps, told me I should patent the design, or at least sell the plans. But I'd rather see more people build these traps, enjoy them, and increase the genetic diversity of local bees by catching resilient feral swarms. **A swarm trap on every tree — that's my vision of America of the future. So here are the complete plans:**



A swarm trap building party is a great way to build enough boxes for the entire community, in a single day.

Materials list (makes 8 swarm traps)

- 19/32" pine plywood, construction (sheathing) grade, untreated. One 4' x 8' sheet.
- 3/8" (or 11/32") pine plywood, construction (sheathing) grade, untreated. Two 4' x 8' sheets.
- "Two-by-four", untreated. One 8' piece.
- 14" aluminum flashing. 16' roll.
- Exterior wood glue, one 8-oz bottle.
- 1-1/8" deck screws, 24 (four per trap).
- 1-5/8" deck screws, 24 (four per trap).
- 1" sinker nails, 1 lb (40 per trap). Or: 1" brads or staples with pneumatic gun.
- Manual staple gun with 1/4" staples.
- Exterior acrylic primer / sealer, 1 qt.
- Light-colored exterior acrylic paint, 1 qt.

Tools used

- Circular saw with a guide — to bust plywood. (Alternative: handsaw.)
- Sliding miter saw — to cut to size the ripped strips of 19/32" plywood and "two-by-fours". (Alternatives: handsaw; circular saw; or table saw.)
- Table saw.
- Dado blade — to cut frame rests (rabbets) and entrances. (Alternatives: for rabbets — handsaw or router with 1/2" straight bit; for entrance — router or drill & jigsaw.)
- Hammer. (Alternative: pneumatic staple gun.)
- Cordless drill / driver.
- Metal shears — to cut flashing. (Alternative: utility knife.)
- Utility knife — to score flashing.
- Staple gun — to attach flashing.

Step-by-step building instructions

Here is a swarm trap we are building (Figure T1). It will look even nicer when painted and occupied by bees!

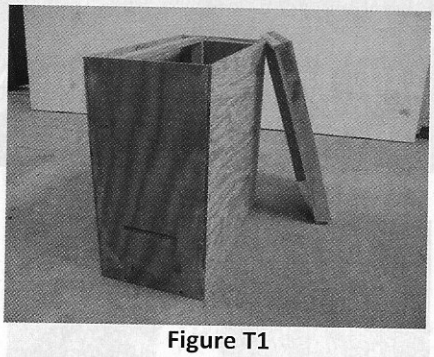


Figure T1

1. Cut 19/32" plywood as shown in Figure T2, making these parts
F — Front wall (8) — 9-1/2" x 19-9/16".
B — Back wall (8) — 9-1/2" x 19-9/16".
BOT — Bottom (8) — 9-1/2" x 18-3/8".

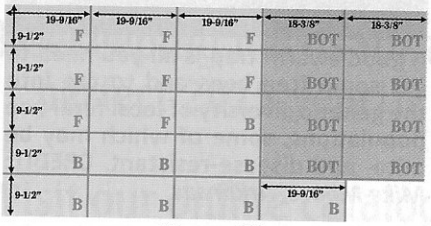


Figure T2

2. Cut both sheets of 3/8" plywood as shown in Figure T3, making these parts:
S — Side wall (16) — 19-9/16" x 19-9/16".

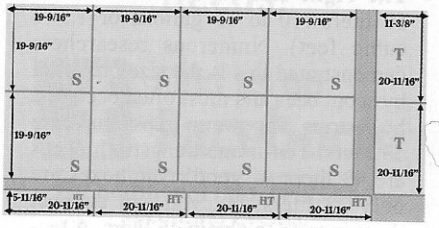


Figure T3

T — Full top (4) — 11-3/8" x 20-11/16".
HT — Half-top (8) — 5-11/16" x 20-11/16".

3. Cut up "two-by-four" into 3 sections 11-3/8" and 3 sections 19-3/4". Rip all sections into 15/32" bars, making these parts:
TS — Top strip short (16 plus 2 spare) — 11-3/8" x 1-1/2" x 15/32".
TL — Top strip long (16 plus 2 spare) — 19-3/4" x 1-1/2" x 15/32".
4. Cut 14"-wide flashing into sections 22-11/16" long, making these parts:
A — Aluminum cover (8) — 22-11/16" x 14".
5. Front (*F*) and back (*B*) walls — cut 7/16" x 3/8" rabbets along the top inner 9-1/2" edge (Figure T4).

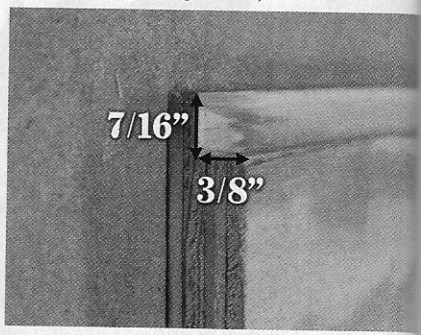


Figure T4

6. Front walls (*F*) — cut a horizontal slit entrance 1/2" high by 4" long, centered, 5" from the wall bottom (Figure T5).

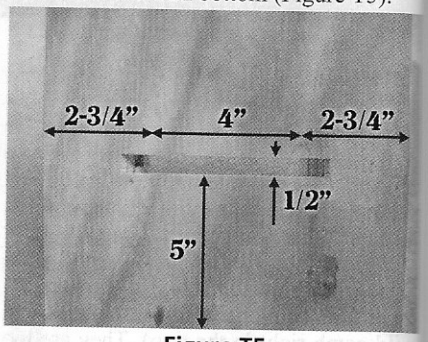


Figure T5

7. Attach the front wall (*F*) and the back wall (*B*) to the bottom (*BOT*), making sure the frame rests look inside (Figure T6). Pre-drill through the face of the wall into the bottom, apply wood glue, and assemble on 1-5/8" deck screws (Figure T7).

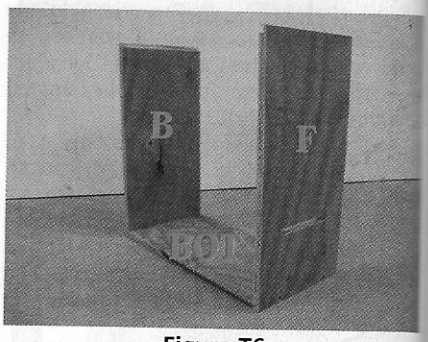


Figure T6

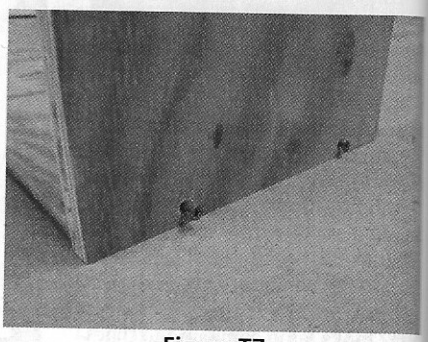


Figure T7

8. Attach side walls (*S*) with glue and nails, Figure T8. (Alternative: use pneumatic staple gun.) The box is ready (Figure T9).

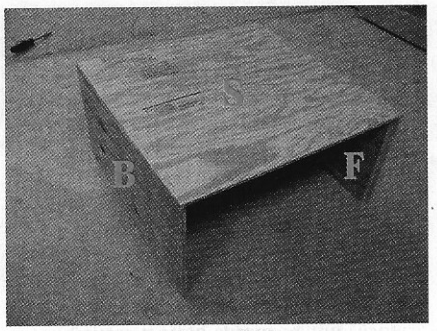


Figure T8

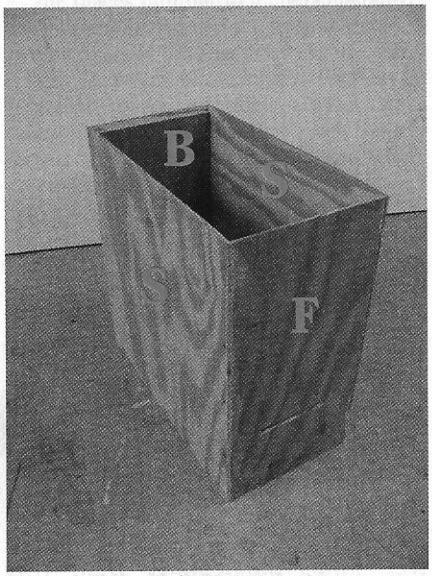


Figure T9

9. Assemble the top. Glue and nail (or staple) the rim together; the long strips (*TL*) go between the short strips (*TS*) — Figures T10 and T11.

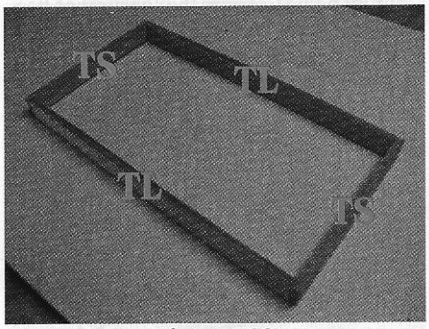


Figure T10

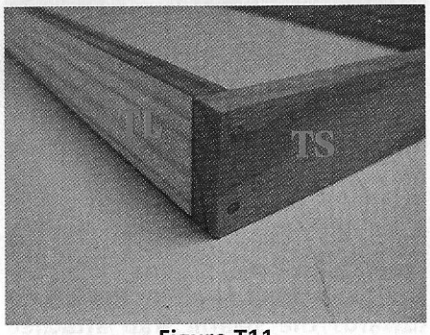


Figure T11

10. Glue and nail (or staple) the top plywood (*T* or two half-top pieces, *HT*) — Figure T12.

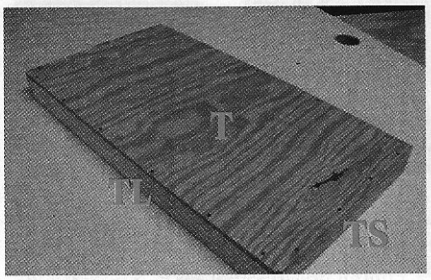


Figure T12

11. Lay aluminum flashing (*A*) flat; center the assembled top on it (Figure T13);

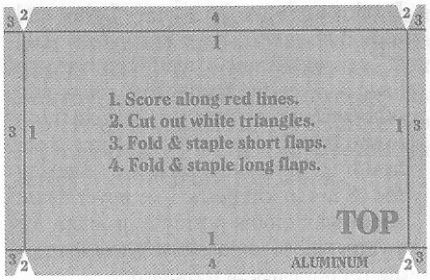


Figure T13

score the perimeter with a utility knife; cut out flashing flaps (Figure T14); fold the flaps (Figure T15), tapping with a mallet or woodblock, and staple to top's rim using a manual staple gun (Figure T16). The swarm trap box and the lid are complete (Figure T17).

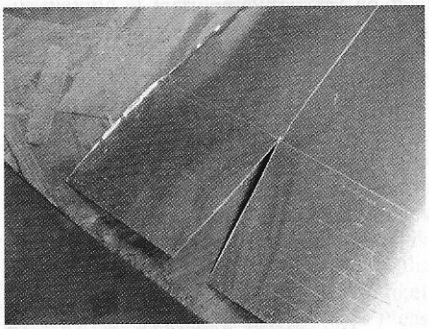


Figure T14

Figure T15

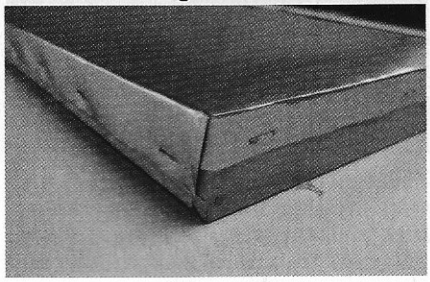


Figure T16

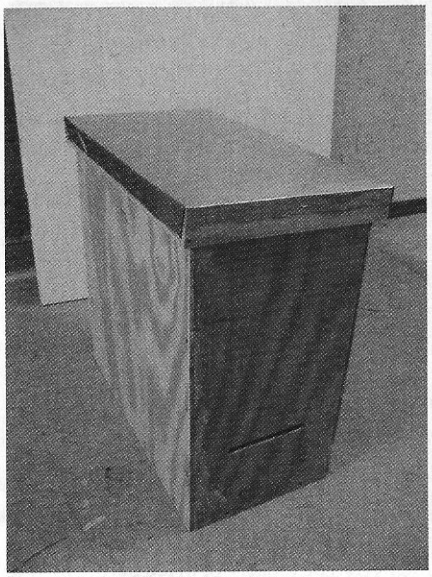


Figure T17

12. Apply a coat of primer / sealer to all exterior surfaces, let dry. Apply a coat of paint, let dry. Done!

Preparing the trap for first use

1. Generously rub all interior surfaces with *propolis*.
2. Apply a few drops of *lemongrass essential oil* (more on lures below).
3. Insert six frames and drive four small nails into the frame rests so the frames don't shift (Figure T18).
4. Close the top and secure it to the swarm trap body (front and back walls) with four 1-1/8" deck screws (pre-drill top's rim so it does not split) — Figure T19.
5. Weigh the swarm trap. This way you'll be able to find out the size of the swarm that moves in.

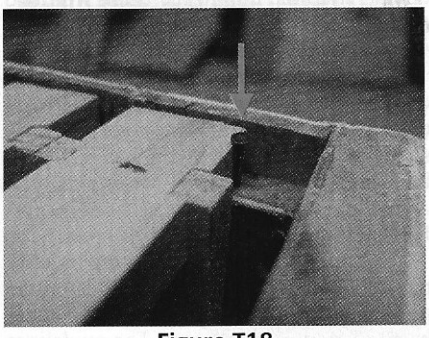


Figure T18

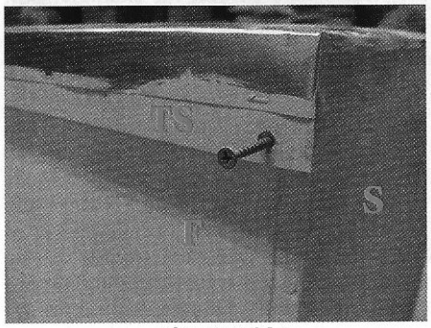


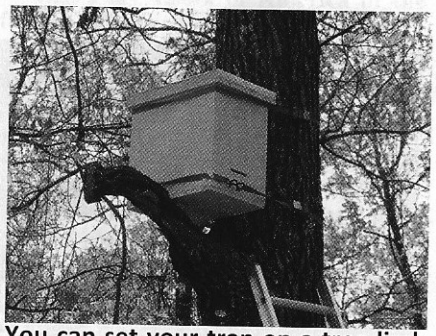
Figure T19

Hanging a swarm trap

Whenever possible I just drive my minivan up to the tree, climb on the roof, and hang the trap from there (I have a wide board strapped to the roof rack to serve as standing platform). Otherwise I use a 20-foot extension ladder.

There are several ways to attach the trap to the tree. The quickest option is to tie a piece of wire around the box right under the rim of the telescoping cover (four screws hold the cover in place). Twist the wire to make a 2" loop in the center of the long side that will face the tree. Drive a screw into the tree and hang the box on it, like a painting. Then secure it to the trunk with a ratchet strap.

Another possibility is to pick a tree with a large limb at the needed height. Put the swarm trap on the limb and strap it to the trunk with two ratchet straps. I position the ratchet straps loosely in place before raising the trap into the tree.



You can set your trap on a tree limb and strap it to the trunk. Two ratchet straps are recommended — in case one fails.

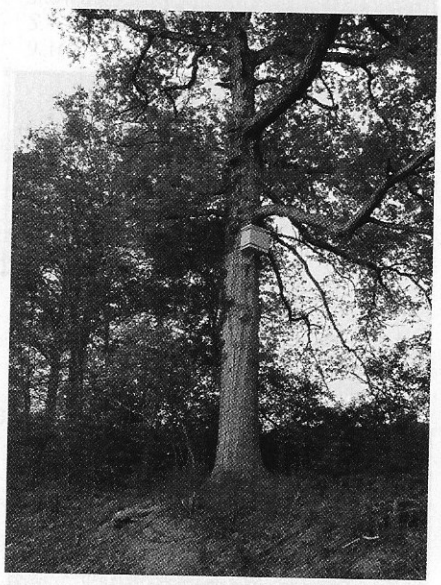
Finally, you can raise the trap on a rope. Swing it over a branch, tie around the trap, and pull. Tie your end of the rope, climb up and strap the trap to the trunk with two ratchet straps. You can then release the rope — the straps will hold the box.

Tilt the trap forward just a bit so rainwater does not run in through the entrance. If you use foundationless frames (or just top bars), set the trap as level as possible, so the bees build straight comb.

Keys for successful use

Of course, a good swarm trap is only part of the story. As much depends on the presence of honey bee populations, proper baiting, and trap placement. The guidelines are widely known: see, for example, *Bait Hives for Honey Bees* by Thomas Seeley, Roger Morse, and Richard Nowogrodzki (Cornell University extension publication no. 187, download free from their website). Seeley's *Honeybee Democracy* offers a fascinating and complete discussion of a swarm's behavior and how they choose their new home. Here is a list of key success factors that can be gleaned from these and other publications, from talking to experienced swarm catchers with consistently high success rates, plus from my own experience.

- **Baiting** — if the box was not previously occupied by bees, I scent it with *propolis*. Warm it in your hand for a few minutes and when it becomes supple and sticky, thoroughly rub all interior surfaces. Then apply a few drops of *lemongrass essential oil* — right into the trap or, for slower release, on a cotton ball in a Ziploc bag, of fill a micro centrifuge lab tube and put inside the trap. The commercially available *slow-release pheromone lures* should work even better. Make sure to keep them frozen or refrigerated until use.
- **Dark comb** — the scent of wax and old comb is attractive to swarms. Add at least one frame of dark comb if you have it. Even the frames that you would otherwise discard make a good addition to the trap. Make sure they come from healthy colonies and sanitize by freezing for 48 hrs to kill pests. I've never heard about wax moths posing a problem for swarm traps — possibly because traps are set out early in the season.
- **Ideal height** — *12–15 feet* off the ground is best, as confirmed by numerous studies. It is possible to catch swarms in traps positioned lower, but scout bees seek sites offering good protection from predators and damp ground, so they first look higher up. Together with baiting (scenting) the box, the height is reported to be especially important.
- **High visibility** — if you cannot see the trap from 100 feet, the bees will have trouble discovering it. Traps hidden behind leaves and branches are rarely occupied.
- **Full shade** desirable — bees reject a box if it overheats. If you do not have full shade, at least put it in partial shade or on the north side of the tree trunk.



This fencerow oak is an ideal swarm trap site that stands out. Prominent, highly visible, fully shading the box, adjacent to natural vegetation, and close to a creek.

- **Light box color** — by the same token, do not paint the box with dark paint to avoid heat buildup. You can leave the trap unpainted, but priming and painting it in a light color (e.g., white, light gray, etc.) will *significantly* prolong its useful life. If swarm trap theft or vandalism is a potential issue where you live, you can paint it in a light camouflage pattern that blends in. In Russia many beekeepers glue a thin layer of bark all over the trap. It gets heavier, takes additional work, but becomes almost invisible to human eyes.
- **Large landmark trees** work best — on the edge of the woods, along country roads, power lines, in fencerows, yards, etc. Bees see fork shapes particularly well, and I had lots of luck with trees that have a clear trunk with large boughs coming from it.

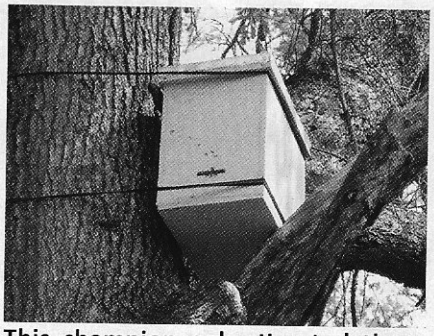
Bees can see forked shapes and big tree limbs particularly well. This V-shaped sycamore by a stream at the woods' edge consistently attracts swarms every season.

- **Proximity to swarming colonies** — it surely helps to know the location of bee trees and bee yards. But do not put the

The bees proved totally indifferent towards the swarm trap attached right to their bee tree. They preferred to move into a similar box hung some 50 ft away on an oak tree, properly raised 15 ft off the ground.

trap too close to the existing colony. Winston (*The Biology of the Honey Bee*) cites studies suggesting the good range from several hundred feet to 1 mile from the hive. My traps on bee trees or right by a bee tree never worked. But swarm traps positioned as little as 50 or 100 ft from the known colonies were repeatedly occupied.

- **Places bees visit** — the scout bees that look for a new nest site are the same bees that were previously foraging for nectar and pollen. They will first look in the places familiar to them. This is why "high traffic areas" — gardens, orchards, and especially areas with a rich diversity of wild nectar plants (meadows, bottom fields, glades, old fields reverting to natural vegetation) are particularly suitable. Areas with little bee food (e.g., pastures or conifer forests) rarely attract a swarm.
- **Source of water** — water is an everyday necessity for any bee colony. I am finding that 100% of the swarms I catch occupy traps hung within several hundred feet of a creek or pond. This may be especially relevant for locations with hot, dry summers. In dry areas in Russia some beekeepers hang plastic water jugs right by the swarm trap. (Usually a 2-liter soda bottle or a 1.5-gallon drinking water jug.) They pierce a pinhole in the lid, reverse the jug and let water slowly drip on a piece of board attached by the trap. Bees discover the "fountain," come to collect water, learn the location, and the swarm trap is more easily discovered.
- **Spread traps 1–2 miles apart** — this maximizes your chances. If you hang traps close by, scouts from the same swarm may discover two or more of them — and, the traps being identical, will have a hard time deciding which one to choose!
- **Swarm trap materials** — wood, plywood, and wood pulp are all acceptable. Natural tree hollows have rough wall surfaces, so no need to try to make them too smooth. If you use wood, rough-sawn boards are actually preferable (and cheaper) to planed lumber; if plywood — regular construction grade works perfectly well, no need to invest in sanded plywood. If *you* walked on the walls, you'd surely appreciate some traction, wouldn't you?
- **Entrance orientation** — some studies have shown slight preference for south facing entrance exposure, but in practice I have not yet met a beekeeper who diligently orients swarm traps with compass in the hand. The majority of my swarms fly into traps with north-facing entrances! If anything, the entrance orientation should be convenient so you don't have to get out of your vehicle (or, in case of my daughter, get off her horse) to see if the box is occupied.
- **Stick to your lucky trees!** The trees and sites that caught a swarm keep attracting more swarms — later the same season and in subsequent years. So putting up an empty trap as you take down the one with the swarm is a very good idea.



This champion oak attracted three swarms during May 2014. Located at the edge of the woods by a stream and large patches of wild nectar plants (wild plum, sumac, etc.). A nearby power line cuts through the woods and makes for a veritable bee highway. Also note the prominent limbs coming from the trunk.

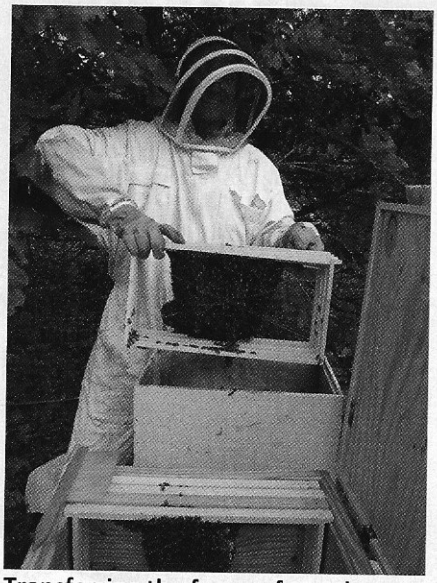
Here comes the swarm

After hanging the traps early in the season, you go about puffing dandelions and reciting your favorite swarm-catching charms, all the while experiencing the high of playing at a high-stakes lottery. Check traps occasionally. If you see lots of bees at the trap entrance (congratulations!) come back to collect the trap at nightfall, after all foragers returned from the field. Before pulling it down, place your ear against the trap and gently knock on the wall. A loud vigorous hum indicates a resident swarm. If the box is silent or you can hear a few bees but it sounds hollow, what you have seen during the day were the scouts that discovered the box, and the swarm is likely to arrive within the next day or two. Please come back later.

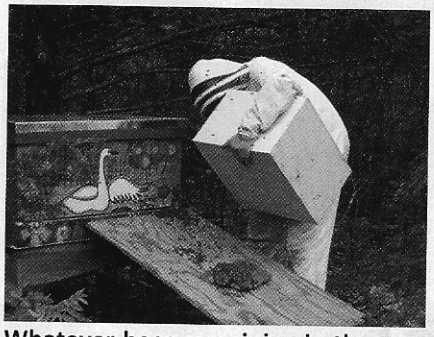
If the swarm is inside, the trap is ready to be moved. If there is a bunch of bees chilling out on the front wall by the entrance, I take a gulp of water and spray them from my mouth. It looks like it is going to rain, so they move inside no questions asked. I cover the entrance with #8 hardware cloth (mesh wire) and staple it in place.

If the swarm trap tree is from 30 feet to 3 miles to where the permanent hive will be located, I first take the trap 6 miles away and leave it there for a week (with open entrance!), then bring and set it by the permanent hive. Without this procedure many bees leaving the hive will be flying to the original swarm trap location and congregating there; moving them away for a week resets their orientation system. If the hive is right under the swarm trap tree, no such precaution is necessary.

When working with occupied swarm traps in twilight, I use a headlamp with red filter. Bees can't see red light — so you can see them without being noticed. Very handy.



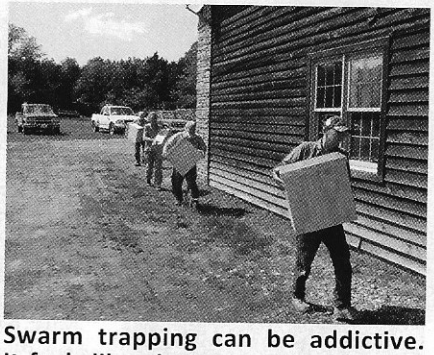
Transferring the frames from the trap into the permanent hive only takes a few minutes.



Whatever bees remaining in the trap are dumped onto a piece of plywood sloping towards the hive entrance. Smoke is usually not necessary and the bees crawl in of their own accord. The empty trap, scented by the freshly caught swarm, is again ready to use.

If the weather turns rainy after a swarm arrives, I give them several pounds of honey lest they starve to death.

The transfer of bees from the swarm trap into the hive is very simple. Pull the frames from the trap and insert them into the hive in the same order. Whatever bees remain in the trap dump on a piece of plywood propped up against the hive's entrance.



Swarm trapping can be addictive. It feels like playing a lottery, but no need to buy any tickets!

Most beekeepers remove swarm traps from trees at the end of the main swarm season. In southern Missouri it is around the 4th of July. But I leave mine up until late September. While I never caught any swarms in July or August, there is a small spike of swarming activity in September. These late swarms are usually relatively small — 2 to 3 lb. They can be united with an existing hive. But I prefer to keep them in the swarm trap and let them build comb and forage until the first hard frost. After that I carry them inside and connect the trap entrance to the outdoors. Given 5 or 6 lb of honey they survive until the spring and develop into robust colonies the following season.

ABOUT THE AUTHOR

Dr. Leo Sharashkin is editor of *Keeping Bees With a Smile: A Vision and Practice of Natural Apiculture*. He lives on a homestead in the Ozarks of southern Missouri where he catches feral swarms and keeps bees in a variety of horizontal hives. He travels internationally presenting on these topics. His website (with free hive plans): **www.HorizontalHive.com**