

4H BB Gun Tips and Tricks

This document is an effort to collect tuning tips for the Daisy model 499 BB gun. This article is by no means a complete list of the modifications that can be made to the gun. However, it tries to demonstrate some of the tuning concepts that can improve your child's shooting scores. By avoiding common problems and improving your shooter's scores it is hoped that this information will help your shooter derive the maximum advantage from their 4H shooting experience.

Daisy Model 499

The Gwinnett County 4H Team SAFE uses only the Daisy model 499. This is not your run-of-the-mill BB gun, but a precision air gun with special features for 4H competition shooting. If you desire to use another gun, please have the head coach inspect your gun before practice starts.

The model 499 is a single shot 0.177 caliber (4.5 millimeter) BB gun. The gun must be hand cocked and hand fed with a single BB before each shot. A single stroke of the cocking lever compresses a large spring inside the gun. When the trigger is pulled, the spring drives a piston forward with enough force to compress air. BBs are then moved down the barrel and expelled from the muzzle using the compressed air.

These guns are not generally available, and must be special ordered before practice starts. The gun must be ordered with the Daisy model 5899 competition rear sight, and the Daisy competition rifle sling. The sights and sling come unassembled and require mounting and adjustment before practice can begin.

Warning

Under no circumstances should the trigger group or receiver be disassembled. There are many very small parts, some held in place only by grease. These can easily become lost or damaged. Replacement parts are not readily available and under the rules, modifications to this area of the gun are not allowed. Again, do not disassemble this part of the gun.

Cleanliness

Most of the problems with gun function can be traced directly to dirt in the barrel and mechanism. Because almost all the practices and competitions are done outside, it is important that the shooter understand the need to protect the gun when not being used. Some suggested guidelines are:

- The gun should always be stored under cover to guard against blowing dirt.
- The shooter should never stick the muzzle in the ground.
- The gun should never be laid directly on the ground.

Barrel Care

The heart of the Daisy model 499 is a precision bored and polished steel barrel about 10 inches long. It is extremely important that the barrel be kept absolutely clean at all times to keep from damaging the surface. The staff recommends cleaning and oiling the barrel before

the gun is ever fired, and once a month thereafter. Due to the introduction of trash, do not use BBs that have been picked up off the floor, or recovered from the target box.

Cleaning can be best accomplished with a Daisy cleaning rod kit (Wal-Mart \$12) and a can of Remington gun oil called "Rem Oil" (Wal-Mart \$5). Solvents are not required since there is no gun powder residue present in an air gun.

Removing the barrel for cleaning is accomplished by turning the plastic tip at the muzzle counter-clockwise. This will allow the barrel assembly to be completely removed from the gun. Assembly is the opposite of disassembly.

BB Selection

BB guns get their name from the abbreviation for "ball bearing". The projectile used is a ground, spherical steel ball that measures around 0.163 inches. Be sure and shoot only Daisy competition grade BBs in your gun. Cheaper types of BBs have a slight flat spot on one side and are not perfectly round. Some types are also plated over with copper or other metals. Using non-competition BBs will irreparably damage the precision bore of your gun barrel.

Additionally, never use BBs picked up off the floor or recovered from the target box. The small amounts of dirt and paper that adhere to the BB will also damage the bore of the gun.

Gun Case

Just like any other precision gun, a model 499 needs to be protected from shock, dirt, and water. The coaching staff highly recommends that your first accessory be a rigid plastic carrying case. These can be purchased at stores like Bass Pro and Dicks for \$9 to \$13.

It is also recommended that your child's name, paint, special stickers, or colored tape be used to individualize your gun and case. At the competitions there will be hundreds of identical guns in identical gun cases. The only way to avoid confusion is to mark your gun and case.

Vibration

Air guns have a very unusual vibration mode, which is more severe than some firearms. Therefore, threaded fasteners have a bad habit of loosening. This is especially true of the screws used to attach the rear sight, which tends to fall off during competition! The 3 screws that secure the rear sight to the receiver should have a 1/4-drop of thread locking compound applied to each of their threads.

The body of the rear sight is very soft cast metal. Over tightening the mounting screws will damage the rear sight assembly. Be very careful.

Thread locking compound is available at Home Depot and local automobile parts stores. The color generally denotes the compound's strength. We suggest the blue color, which will allow future disassembly if required.

Barrel Tightness

It is easy to understand how loosely mounted sights will keep the gun from aiming at the same position as the barrel. However, it is just as important that the barrel be kept in alignment to the sights. The primary point of barrel loosening on the 499 is at the muzzle. The plastic tip of the barrel has a slight taper that normally fits snugly into the end of the gun. However, due to spreading of the steel gun body, the barrel assembly may not be snug in the gun. Looseness here can be fixed by withdrawing the barrel and wrapping the taper with one or two layers of masking tape. Another solution is to wrap the steel gun body with "mechanics wire" at a point just forward of the front sight. Welding is not considered a good option due to warping of the gun body and damage to the gun's finish.

Warning

Under no circumstances should thread locking compound be used to secure the barrel assembly into the gun. Stray compound could be sucked into the piston and keep the gun from firing and cleaning would be made nearly impossible.

Easier Cocking

Moving the cocking lever in the prone position is always difficult. For some younger shooters, cocking the gun in any position can present problems. To reduce the frustration and amount of fatigue, it is highly desirable to use a pair of pliers to slightly spread the metal clips that hold the cocking lever closed. The cocking lever should flop around, but not fall open after this modification is made. This will greatly reduce the force required to cock the gun.

Stock Length

The butt stock supplied with your model 499 is sized for the average shooter. However, your child may be smaller or larger than average. To accommodate for this, the length of the butt stock can be modified to suit your child's body. This is can be done by shortening the wooden stock using a saw or lengthening the stock with extra wood or spacers.

In order to preserve the curved butt plate, one method is to cut the stock about an inch from the butt. This allows stacked washers to be added or subtracted to get the correct stock length. The washers are held in place by running a long wood screw from the butt plate, through the washers and into the butt stock. Other variations of this are also commonly used.

No other external modifications or substitutions are allowed to the stocks under the rules. Homemade stocks that are not an exact copy of the original are also illegal.

Added Weight

In order for your gun to be more stable during shooting, the coaching staff may want to add weight to your gun. This will steady the gun in all positions and increase your child's shooting scores. Weight is added by pouring molten lead into voids created in the fore and butt stocks. This is a special job and is best only done by the coaching staff.

It is against the rules to add weight to the barrel.

Front Sight

Your gun came equipped with a selection of front sight apertures. Be sure that the aperture installed in the gun is the smallest internal diameter provided. It should measure about 0.135 inches. Save the other apertures, the coach may need them later on in the shooting season.

Do not install the straight post type aperture for competition shooting.

Sight Black

The sight picture can be greatly enhanced by blackening the front and rear sight apertures. This is best accomplished by using pliers to hold the aperture over a candle flame. The soot from the candle will apply a thin coat of "lamp black". This carbon coating will eventually have to be reapplied.

Black spray paint is not suggested since it may clog or distort the inside diameter of the sight aperture. However, if a round toothpick is used to keep paint from entering the aperture, then a light coat of spray paint may prove more durable.

Cheek Placement

One of the key elements for repeatable shot placement (especially for new shooters) is being able to place the comb of the stock in the same position on the shooter's cheek for every shot. As an aid to repeatable cheek placement you might want to use some clear packing tape to affix a single BB to the comb. If the shooter then lets the BB press into their face at the same point each time, then the cheek placement is identical. When the shooter is more experienced the tape can easily be removed.

Sight Adjustment

When the shooter reaches the point where they can place 4 out of 5 BBs in nearly the same hole in the target, the shooter is said to have a good "shot group". Only at this point can the rear sights be adjusted to bring the shot group onto the "bull's eye" of the target.

Only the rear sight is adjustable. If the shot group falls directly to the left of the bull's eye (at the nine o'clock position) then turning the side-mounted knob in the R direction will bring the shot group to the right. Accordingly, if the shot group falls directly below the target center, then turning the top-mounted knob in the U direction to bring the group upward. Initial sight adjustments are usually a combination of both horizontal and vertical adjustments.

Both rear sight adjustment knobs contain a detent action that can be felt in the fingertips and may also include an audible clicking sound. One hop to the next detent position is commonly called a "click". This clicking mechanism keeps the sight adjustment from changing during the vibration of firing and transport. To move the shot placement one whole target scoring ring usually involves 4 to 5 clicks per ring. For example: if your shot group fell at 3 o'clock in the 7 ring, then a 15 click adjustment would be needed in the L direction.

Once the sights are adjusted (or "zeroed") there should not be much need for major follow up adjustments unless the gun has been dropped or mishandled. However, a change in shooting

range lighting conditions can alter the way the eye perceives the target, and an initial adjustment may be required. The parent/coach should be aware of this phenomenon.

If you want to be absolutely sure of the "zero" of the sights, the gun can be placed on a very stable surface using books and other dense materials to prop the gun into position. The barrel can be weighted down with bags of rice to keep it from moving violently during shooting. This will remove 90% of the human components and a reliable adjustment can be more easily made. Be sure during sighting to shoot at targets placed exactly 5 meters (16 ft) away.

Pre-Shooting Check List

Here is a helpful list of items to check before each practice and competition:

- Rear sight is tightly mounted to the gun
- Rear aperture is snug in the rear sight mechanism
- Front sight is tight and does not rattle
- Sling mount is tight in the fore stock
- Butt stock is rigidly mounted to the gun
- Fore stock is rigidly mounted to the gun
- Barrel is clean
- Barrel assembly is tightly screwed into the gun, with no perceptible play
- All BBs to be shot are measured to be the same size
- All BBs to be shot are new and clean
- All BBs to be shot are stored in a small, clean container
- Sling is attached to the gun and the clip is functioning freely
- Gun and case are marked for positive identification

Conclusion

Use common sense. Remember that improved equipment and a solid shooting position go hand-in-hand. It makes no sense to invest in an improved rear sight if the shooter has not reached the point at where they can hold the gun steady.