Setting up a recurve bow

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These are the steps I take in setting up a recurve bow. Many of the steps are also relevant for a longbow (although the longbow does not have many of the adjustment possibilities).

Most recurve bows have adjustable draw forces. To start with, set both limbs to about the middle of their adjustment range. This gives scope to adjust the draw force in either direction when tuning the bow later. Similarly, most recurve bows have lateral adjustments for both limbs – again, set these to the centre of their range.

Install the limbs and string the bow. The string for a recurve bow is usually 3 inches shorter than the stated bow length. That is, a 68 inch bow can be expected to have a string about 65 inches long. The string should have about 1 full twist per inch (more is ok, less is not, 'none' is terrible).

The bow's brace height is the distance from the inside of the grip to the string. Set it, initially, to the mid-range of the manufacturer's specification. For my 68 inch Hoyt Formula riser with Velos limbs, I set it to about 22 cm. The string should be following around part of the recurve, but not too far. This is important as otherwise there will not be sufficient time for the arrow to properly flex around the riser during the bow's power stroke.

Note that most of the longbows I see have the brace height set too low. This does not allow sufficient time for the arrow to properly flex around the riser during the bow's power stroke.

Once the bow is strung, measure the top and bottom tiller distances. The top tiller is the distance from the face of the limb where it enters the limb pocket to the string, and similarly for the bottom tiller. I set these to be the same by adjusting the appropriate limb bolt. Some archers set the top distance to be greater than the bottom distance, but I find that setting them to be the same is better.

Now it is time to set the lateral limb positions. (I have found that for top quality bows, they are usually very close or perfect, straight out of the box – for my bow, that was the case and no adjustment was needed).

Typically, bows will have at least several holes in the riser for mounting weights. There will also be the rear of the draw force adjusting bolts. For a good quality riser, all these holes will be on the centre line of the riser. From behind the string, visually line up the string with one of the draw force adjusting holes. If everything is perfect, the string will also be aligned with all the other holes and down the centre of both limbs. If that is not the case, you need to decide which limb lateral position to adjust, make that change, and then test it again.

If the lateral position of both limbs is correct, the side of the bow window will be parallel to the centre line of the bow. This can be tested in two ways. First, assuming the bow is of reasonable quality, the front stabilise mounting hole will be on the centre line of the riser. A good quality long stabiliser mounted directly to the bow should then be on the centre line of the bow. Standing behind the bow as before, with the string aligned with the rear of the draw force adjusting bolt holds, the front stabiliser should also be on that same line.

Alternatively, since the bow window is almost always cut past the centre line of the bow and flat, we can use that to test the limb alignment. For a Hoyt riser, place a 23-size arrow flat across the bow window. The outer edge of the arrow shaft should then be on the centre line of the bow. That is, the string should be on the line of the outer edge of the arrow shaft. This test is not viable if the bow window is rounded.

Next, install the bow's pressure button. If there are two mounting positions, use the position directly above the inner portion of the bow's grip, not the position forward of that. Set the spring tension to about the middle of its range.

The arrow rest can then be installed. Make sure that the arm of the arrow rest is close too but not touching the pressure button. I find it best to have the end of the arrow rest arm slightly turned up to ensure that the arrow stays in contact with the pressure button at full draw.

Next, we need a nocking point on the string. It is best to use a tie-on nocking point both above and below the nock. Allow a small amount of vertical movement of the nock on the string – perhaps about 1 mm. Place the nocking points so that the arrow is about 2 to 3 mm above square on the string (noting that we may need to change that later).

Place an arrow on the string and resting on the arrow rest and against the pressure button and look along the arrow from behind. I like to adjust the pressure button position so that the arrow is on the centre line of the bow or out slightly from that position. The arrow rest arm should then be adjusted so that its end is just outside the side of the arrow.

The sight can now be mounted on the bow. Set the angle of the sight bar so that it is vertical when the bow is held at its natural angle. This approach ensures that, when there is no wind drift, the lateral position of the sight should be the same for all target distances.

Install the clicker using one of the mounting holes in the riser. In general, I prefer to use the mounting hole that minimises the tension in the clicker when it is sitting over the arrow.

I prefer to use a long front stabiliser and two short rear stabilisers off a V bar, with the rear stabilisers angled down a little. I see no value in using a V bar extender (other than helping pay for the manufacturer's Porsche).

We are now ready to adjust the bow so that the arrow flight is correct.

I use three tests to examine the arrow flight:

- Visual observation of the arrow flight over about 30 m.
- The angle the arrow enters the target at about 10 m.
- A bare shaft test.

The sound of the bow as the arrow leaves the string is used to adjust the bow's brace height.

Tuning a recurve bow

I am assuming a right-handed archer and that correct spine arrows have been selected. I treat barebow recurve the same as sighted recurve.

We want the arrows to exit the bow aligned with their direction of travel and for the rear of the arrow to not hit the pressure button as it passes. Note that the path the arrow takes will be a little to the left of its alignment at full draw. This means that the sight will probably need to be a little further out than directly above the arrow.

The arrows can be selected using a table or application provided by the arrow manufacturer. The Easton shaft selector is the best of these that I am aware of. Noting that selecting the correct spine is not easy and prone to error, I prefer to use an arrow shaft length such that the clicker will need to be a little out the front of the bow. That gives scope for reducing the arrow length a little if it is found that the arrow needs to be a little stiffer to work well.

The first test I run is to shoot at a target about 8 to 10 m away, looking to see if the arrow enters the target lined up with its direction of travel or not. This should provide a good indication of the position of the nocking point – if the rear of the arrow is low, the nocking point is probably too low, etc. If the rear of the arrow is to the left, the arrow is probably slightly under-spined. Adjust the nocking point first and try again. If it looks like the arrow is under-spined (too weak), increase the pressure button spring tension. Another possible adjustment is to lower the bow's draw force. Vice versa if the arrow is over-spined.

I then visually observe the arrow flight at a target distance of about 30-40 m. We are looking for the first direction of movement of the rear of the arrow. If it is up, the nocking point is too high. If it is to the right, the arrow is probably over-spined. And so on. I know this is not easy without practice in watching arrow flight, but it is a very good skill to learn – after many years of practice I find I can see their behaviour very easily and clearly – you need to look along the expected path of the arrow.

The third test is to shoot both fletched arrows and unfletched arrows at about 20-30 m. There is no point in doing this test at longer distances at that would not provide increased information or accuracy. Note that the unfletched arrows need to have a small amount to tape added at the rear to make up for the mass of the missing fletches. If the unfletched arrows hit below the fletched arrows, the nocking point is too high, and vice versa. If the unfletched arrows hit to the left of the fletched arrows they are over-spined, and vice versa.

Note that there are a few 'tricks' that can be used if the arrows seem to not have the correct stiffness. An arrow that is too stiff (over-spined) can be made to perform the same as a lower spined arrow by adding more mass at the point or at the rear of the arrow (for example, by using heavier fletches or nocks), and vice versa. If the arrow is a little over-spined, a lower mass bow string could be used, and vice versa. Note that in doing this we are not changing the spine of the arrow, just the way it behaves during the bow's power stroke.

Adjust the brace height by a small amount and see if it makes the bow quieter.

Run a powder test to check that the rear of the arrow is not hitting the pressure button as it passes it.