weaversbazaar

Technical Article #3: Warp Setts and Weft Bundles

The area around which most questions are asked of us is all about warp choices and weft bundles. In responding to these questions, we usually refer to the technical specifications on warp and weft shown on our Knowledge Zone. But we thought it might help to put some explanations around that data to better help an understanding of what impacts on the choices of warp and weft. It is important to stress that factors influencing choice of weft and warp differ for tapestry weavers from cloth weavers. In this article, we will concentrate on the context of tapestry weaving. Cloth weavers will find some really valuable information contained in the report provided by Janet Phillips' Masterclass students, on choices of warp settings and the resulting fabric types.

The number of warps you sett for a tapestry will be determined by the design you want to create and that may include: the overall size of the tapestry, the complexity of the design, the dominance or otherwise of curves and/or circles, the simplistic or complex nature of the colours required. A very simple guideline is that the closer together the warps are sett the more complex the design that can be realised, especially if it involves curved lines, but the less subtle the colour mixes might be. The wider apart the warps are sett the more complex the colour mix possibilities but the design must be simpler. One way to identify the right warp size is to pick out the smallest element in the design and ensure that it is covered by at least a single warp.

The choice of warp type depends on the decision about how close or far apart they need to be – but there is some overlap between the various thicknesses. Below is a table of the various sets we have found work for the cotton warps we supply.

Warp type ➢ Number of warps, or ends per centimetre (epc) ⮟	6s (Fine)	6s (Medium)	9s	24s
2 epc	✓	✓	✓	✓
2.5 epc	✓	✓	✓	✓
3 epc	✓	✓	✓	✓
4 epc	✓	✓	✓	
5 epc	✓	✓		
6 epc	✓	✓		
7 epc	✓			
8 epc	✓			

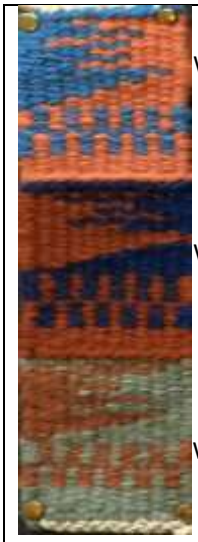
Weft choices and 'bead' size

There is another feature of weft thickness that perhaps needs to be considered. Every pass of a weft over a warp creates a 'bead'. The image of the woven tapestry is made up of these 'beads' of colour. The thickness of the yarn and the sett of the warp will determine the shape and size of these 'beads'. We took our weft yarns and wove them across 10 different warp setts. What became clear was that even the finest of yarns

will cover the warps but as the number of strands of yarn in the weft bundle is increased the quality of the 'bead' changes. Table 2 (below) summarises our findings when using weft bundles of the same yarn.

Cotton Warp type /Sett Weft Type	6s (Fine)			6s (Medium)		9s		24s		
	8 epc	7 epc	6 epc	6 epc	5 epc	4 epc	3 epc	3 epc	2.5 epc	2 epc
Fine (18/2) # of strands	1-2	1-3	1-4	1-4	1-5	1-6	1-8	1-8	1-14	1-18
Medium 1 (9.5/2) # of strands	1	1-2	1-3	1-2	1-3	1-3	1-6	1-5	1-7	1-10
Medium 2 (7/2) # of strands	Barely 1	1	1-2	1	1-2	1-3	1-5	1-5	1-6	1-7
Heavy (5/2) # of strands	X	X	X	X	1	1-2	1-3	1-3	1-4	1-5

To illustrate this, here are images of three small sample tapestries, each woven on a different warp sett. In each case the bottom section is woven using Heavy yarn, the middle section is woven using Medium 1 yarn and the top section is woven using Fine yarn. You can see the change in the quality of the definition of the shapes and patters as you move from the thicker, wise sett warps to the finer, close sett ones. They are not shown to scale

 Weft: 16 strands Fine Weft: 8 strands Medium 1 Weft: 4 strands Heavy	 Weft: 8 strands Fine Weft: 4 strands Medium 1 Weft: 2 strands Heavy	 Weft: 4 strands Fine Weft: 2 strands Medium 1 Weft: 1 strand Heavy
Warp sett 2.5 epc (24s cotton warp)	Warp sett 3 epc (9s cotton warp)	Warp sett 4 epc (6s Medium cotton warp)

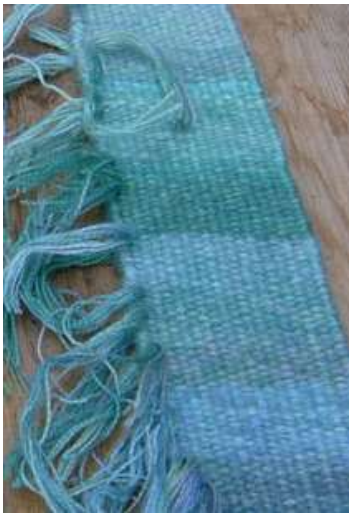
Weft choices and colour mixing

The next question is how thick the weft should be or how many strands of weft are needed. At a very basic level the weft needs to be as thick as the warp. If straight forward blocks of colour are being woven, then the weft can be a single strand of whichever the thickest 'weaveable' yarn might be. As the colour mixes become subtler, or merging/blending of colours is required, then combining several strands of different coloured finer wefts can enhance that effect.

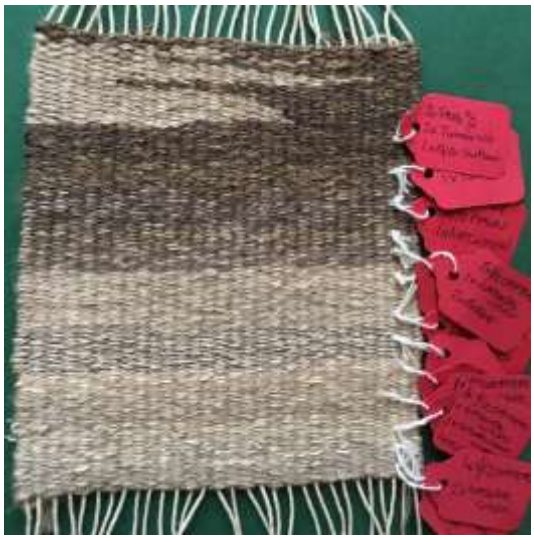
Mixing weft thicknesses

Yet another option on weft choices is to mix thicknesses. So, for example, it might create a better woven surface to combine one Medium 1 strand with two or three Fine strands, rather than using 4-6 Fine strands on their own. Or perhaps one Heavy strand with two Medium 1 or Medium 2 strands instead of four Medium 1 or 2 strands. The way a slightly thicker yarn works with the finer yarns could create a very interesting 'bead'.

Sampling



All the above shows clearly that there is not ONE choice of weft yarn thickness for ONE warp sett – there are many options. Nor is the choice of warp and weft an exact science – what we have provided here are guidelines based on our own experience. But it is critical to create samples of different warp setts using various weft combinations to establish the finished surface texture that suits the design. These samples can, over time, build up to create a library of reference points and an invaluable resource so it is critical to ensure that both warp sett and weft bundles can be easily determined when revisited. When attending our first Summer School, at West Dean, Lin and I purchased several bags of mixed butterflies from the tapestry studio. We then shared them out so that we each had a good array of the colours and we wove them on a narrow warp sett of 3 epc. As you can see from the photo (left), by leaving a good length of the weft tail at the start of each section it is easy to see the constituency of that weft and by then looking at the woven section there is a good impression of the resulting texture and colour. Another form of sample is shown (right). Here the warp sett and weft details are on attached labels.



Conclusion

The choice of warp sett and weft mix is critical to the overall finish of a tapestry image. Because of the many variables that need to be taken into consideration, sampling is essential. It ensures that all possible combinations of warp sett and weft mixes have been tried and the ideal one selected. Whilst guidelines can be provided in the form of wraps per inch/centimetre or ends per inch/centimetre for both warps and wefts, they are just the starting point. It is for the weaver to determine to final choice of warp and weft that will achieve the outcome desired.