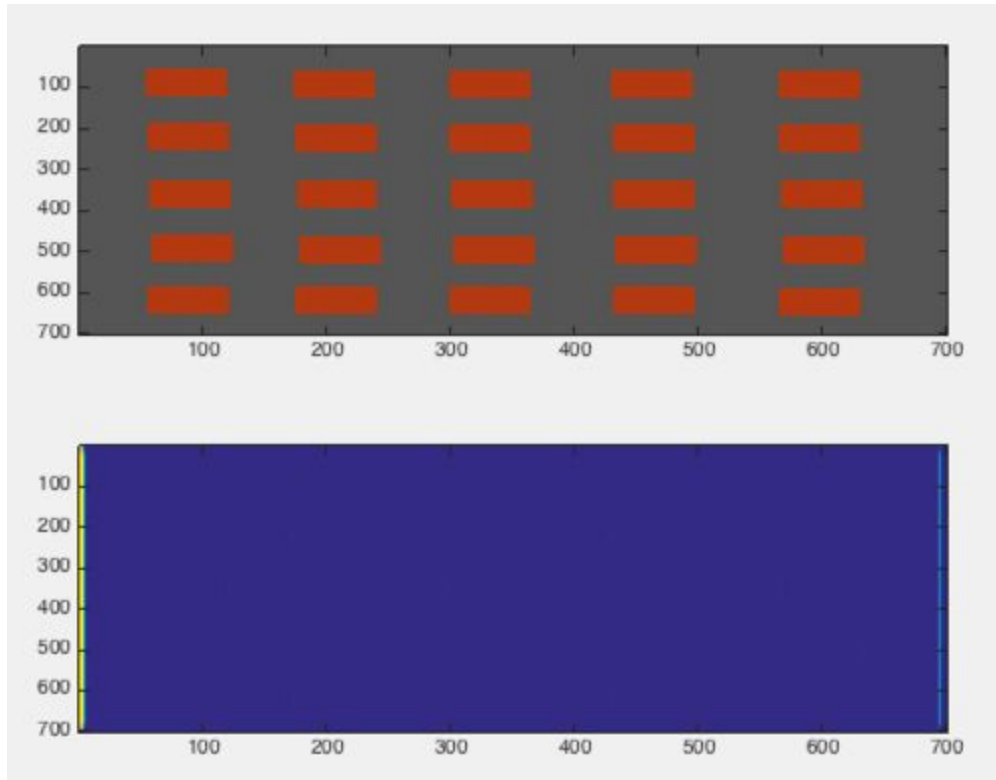2.1   - Stim1 image with 3 individually applied gabor filters


Although it is easy for my eyes to pick out the red boxes, the gabor filters are only looking at each color channel independently, making the edges considerably more difficult to find. Slight edges can be found by tuning the function a bit (as I put in the comments of my code), but this shows that gabor filters are not optimal on their own for dealing with color images.

2.2 Stimulus 1 & 2 with each type of Single Opponent filter applied
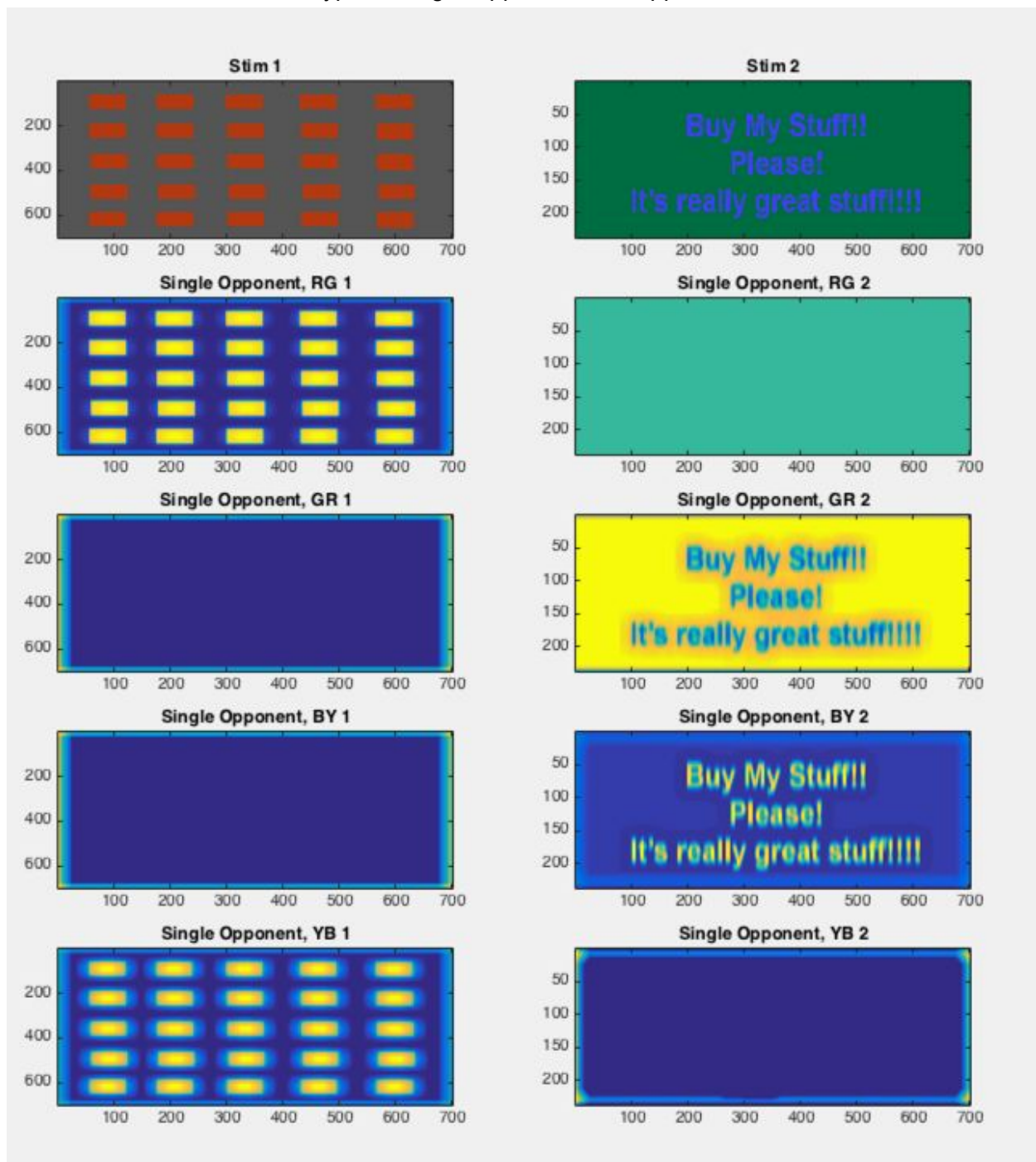
This shows a much better reading than the gabor filters were. By taking into account color gradients we're able to get a great classification for both of these images, the SO filters that work for stimulus 1 do not work for stimulus 2, and vice versa.

2.3 Stim 1 & Stim 2 with each double opponent filter applied
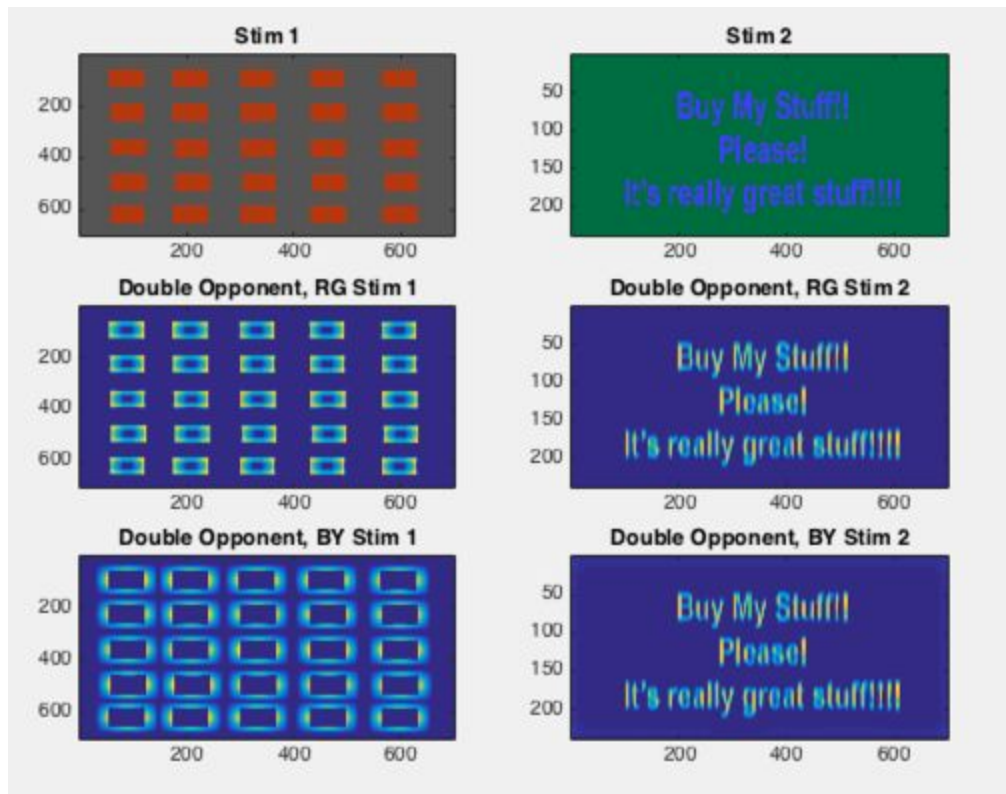
Here we have an even better system for filtering these images. Using the DO version of filtering we are able to account for color gradients we were not able to prior, so that we are able to identify edges on stimulus 1 and stimulus 2 with the same filter. Even though both images have changes unique to their color channels (stimulus 1 has no difference in green/blue, stimulus 2 has no difference in red), our filters are able to pick up the differences between them, and with greater accuracy than the simple gabor filter tried earlier ever could.

Classification:

Average Accuracy: 96%
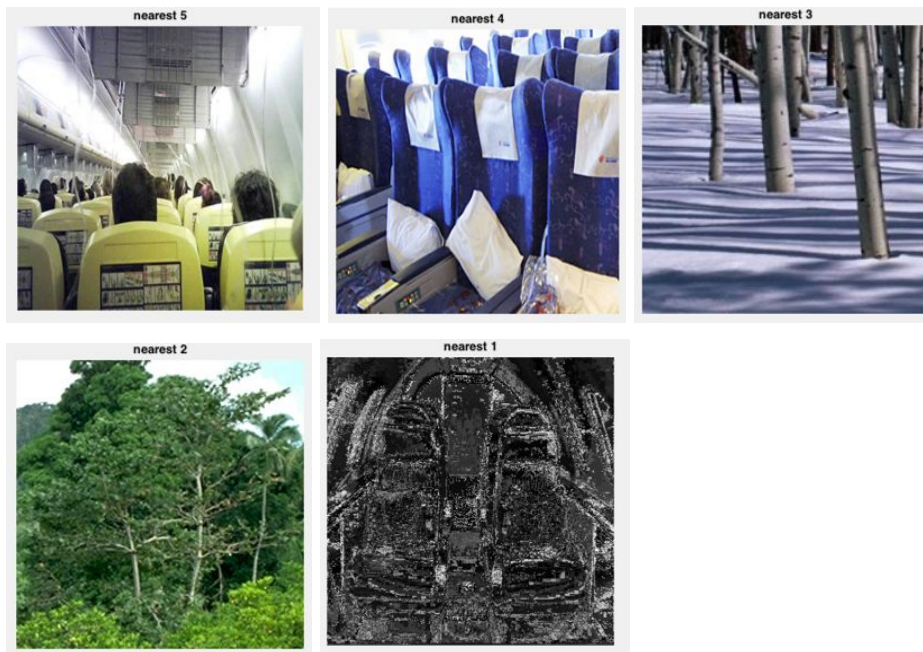
Unfortunately due to the high accuracy of module 2's results, and the inclusion of other gabor filters then were developed with the DO filtering, it is hard to justify exactly which part of the error these close images come from. The nearest 1 image clearly seems to be the least "plane-like" of all of the airplane images, as well as has no color for the color filters to work on, but other than that, it's plausible to say that this model may be a bit overfit, given the 96% accuracy on a 1400 feature dataset with only 230 samples. It's possible also that the forest images may just have a sheerly greater number of edges than the airplane ones, which could be supported by nearest 3 (a very smooth forest image).

No Color Blindness
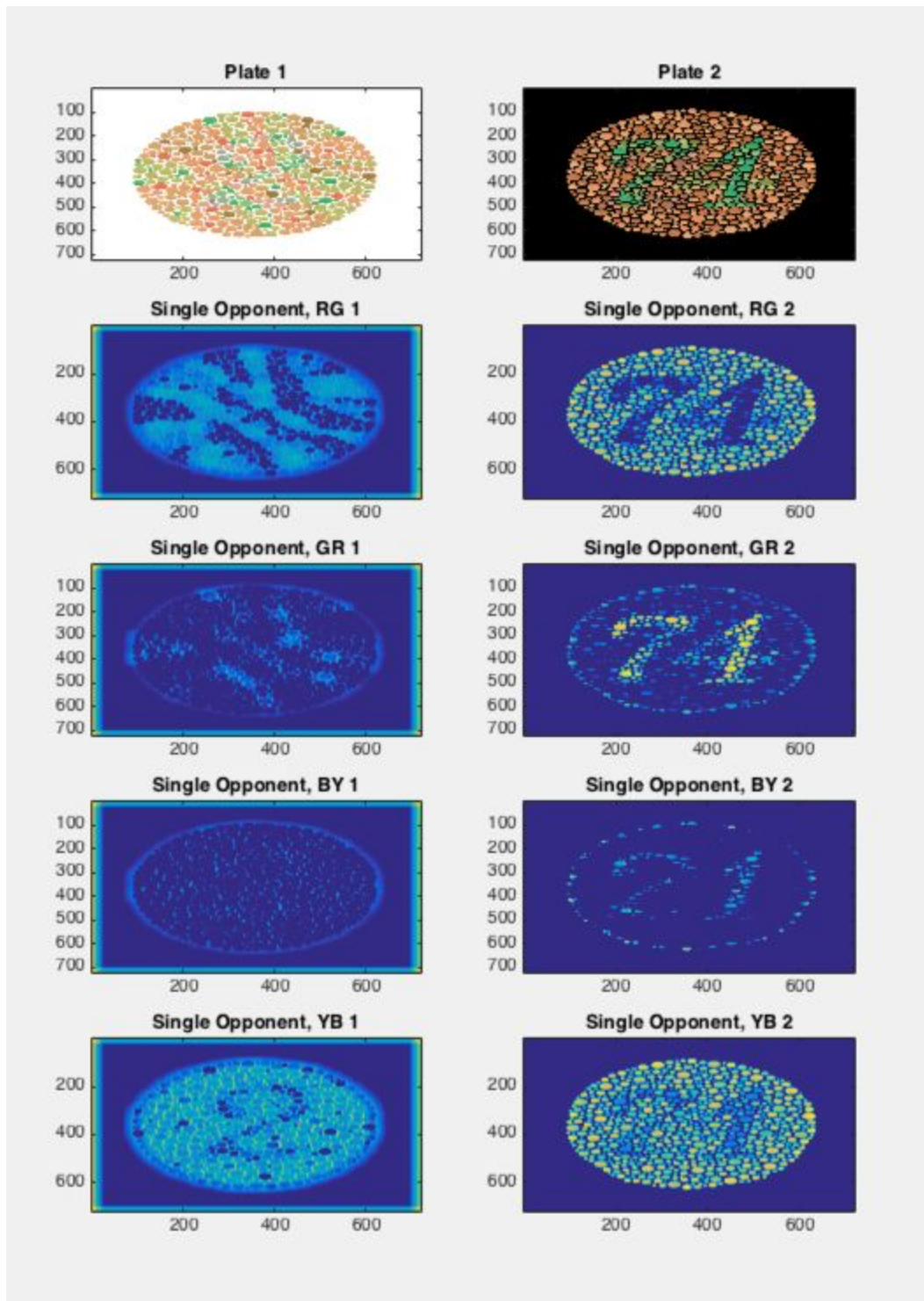
The major discernment in the 74 comes from **green** writing on a **red** background

Protanopes (lacking long, red-like wavelength)
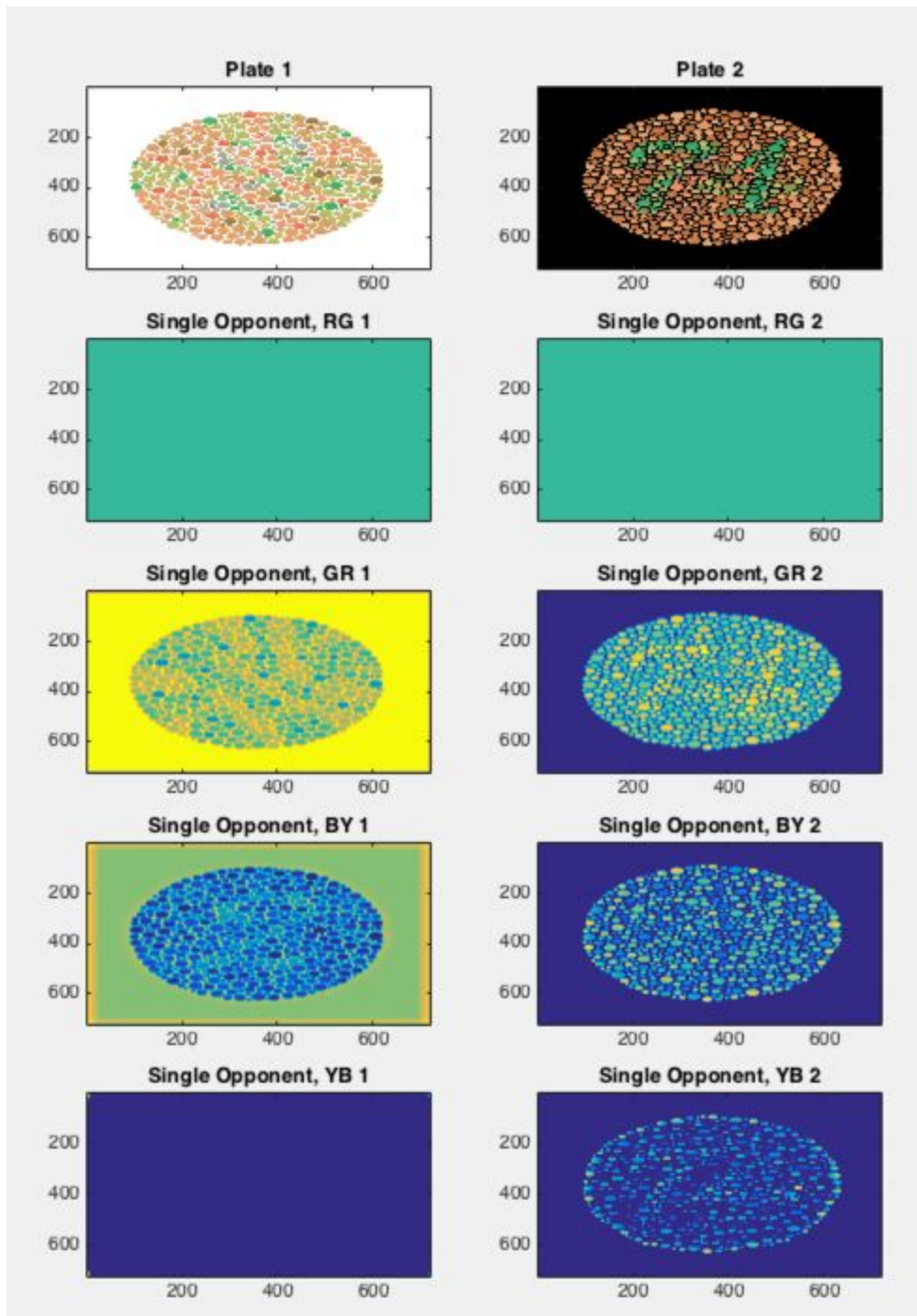
Without the ability to discern red gradients, this form of color blindness would have the most difficulty identifying the 74 according to our model. They could, however, slightly observe a 2 that is not normally seen in the non-colorblind version.

Deuteranopes (lacking medium, green-like wavelength)
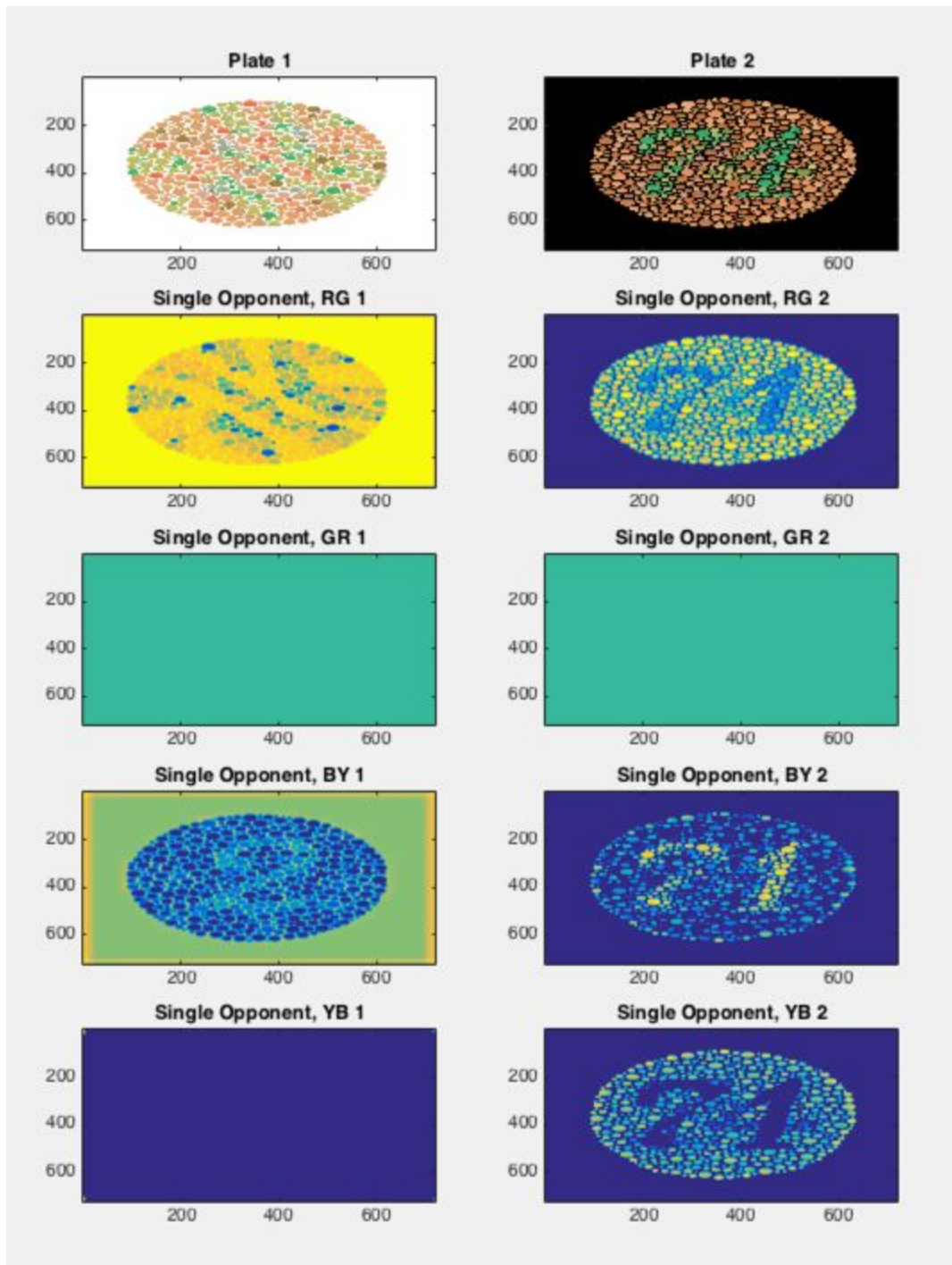
Interestingly, this green-blind filter system shows a strong image of the 74 (by activation around its surrounding through the YB channel) and the hidden 2 from the first slide with greater clarity than even the Protanopes

Tritanopes (lacking short, blue-like wavelength)
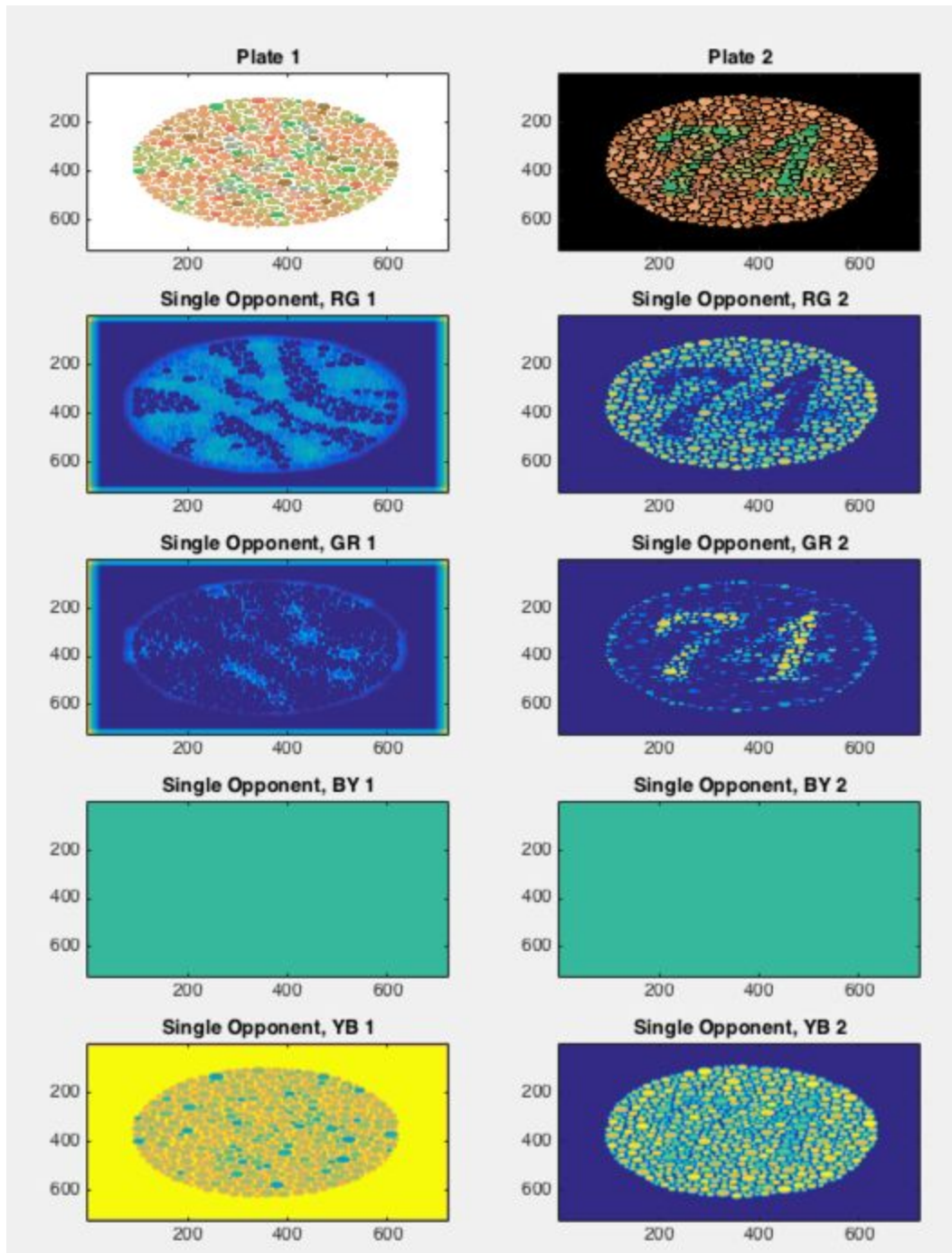
Because there is very little blue-gradient across this image, Tritanopes would see the most similar version to non color-blind in this case.