Bar Code Information for the TCN and Future Digitization Projects

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October 3, 2014

Background and Current Status

The UMMZ Insect Division has been cataloging specimens since around 1997, and early on it was determined by me that a human-readable number was not dependent on software/hardware issues or affected by changing technologies. I started with the Michigan Odonata Survey Catalog numbers, which were designated MOS-xxxxxxxx, where the X is a numeric with leading zeroes. That system is still in place. In the early 2000s, we started cataloging the aquatic specimens, and used the UMMZ with an added I for the Insect Division, so that UMMZI became standard for the alpha part of a catalog number, such as UMMZI-0000023. This distinguishes our number from that of the other Divisions in the Museum of Zoology, and the Herbarium, which uses MICH. We have printed the numbers on sheets of archival linen ledger stock as well as the Resistall-branded stock using laser, dot-matrix and ink-jet printers. The labels were produced by the program EntoPrint, which allowed us to serialize the numbers and print in batches. Although the Entoprint product is now moribund, we still have PDF files containing ranges of numbers up to 500,000. The human-readable numbers are fairly easy to enter into the database, and because the database does not allow duplicate numbers, entry errors are rare and easily corrected. However, a number can be misread from the specimen or the catalog, leading to sometimes erroneous search results.

Future Status

Barcodes and the software have evolved greatly since the late 1990s. All current digitization projects require computer-readable codes as part of the project specifications, and barcodes offer some time-saving in various ways:

Data entry of the alpha-numeric is more accurate and consistent across a range of applications (pinned, slide, alcohol and sleeved specimens).

Once entered, the data is more easily associated with a specimen and whatever is done with the data later on – i.e., specimen loans, where a scan of the code brings up the catalog information, making inventory much easier.

The complexity of our collection preparation types – pinned, fluid, slide-mounted, cryogenic, and sleeved specimens means that one barcode type does not work for all prep types.

Available Options

1. Barcodes can be commercially supplied, printed to our specifications on a variety of paper and adhesive label stocks. These are priced from about 1 cent to 5 cents per label, depending on our requirements and quantity of labels needed.
2. Barcodes can also be printed by us for the cost of the software and supplies, on demand, when we need them, and in whatever application they will be needed for.
3. A mix of pre-made labels from a vendor and others that we generate as needed.

I favor option 2, as it represents a low-cost and sustainable model for us. It does not leave us with depending on an outside source for our barcodes, and should technologies or materials change, we are not left with a bunch of product that we won't use. There is also some rationale for option 3, if it is determined that some specific application need that we cannot do ourselves. However, based on my research and experimentation, I think we can do all we need in-house.

Solutions

Our barcodes for most of the collection can be the stacked 2D code 49 as shown below:

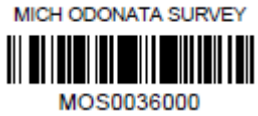
Code 49 and is excellent for pin labels and on sleeved specimens, and for other applications where a label may be at least 10 x 20mm. They are easily laser-printed or produced by ink-jet on our label stock. It is a 2D label, and therefore requires a 2D scanner to read it. Code 49 is in use by many collections and has been proven to be a reliable system.

The labels can also be a more compact Data matrix code such as this:

This measures about 9 x 11 mm, allowing it to be used on slide-mounted specimens, small vials, etc. It can also be incorporated into a standard sized insect label along with the typical locality data. They can be produced on special thermal-printed self-adhesive labels that are permanent and not affected by solvents or extreme temperatures, and are ideal for slides. Without the human-readable number, they can be smaller, but it is better to have both on the label.

an earlier prototype of the datamatrix code.

Another popular code is Code 128, which is a 1D linear barcode capable of alphanumeric strings. It is not used for pinned specimens or slides, but it can be used for vials, objects (such as notebooks, transparencies, etc.), and sleeved Odonata, as a 3x5 card has plenty of room for a Code 128 label.



To produce the labels, we will need to purchase Seagull Bartender Software (Windows only) – it has an easy to use interface that allows quick design and access to data sources for label production on a variety of printers (laser, thermal, etc.). Cost is about $250. You can download a free trial copy from their website (http://www.seagullscientific.com/).

For slide labels, and any applications where we should use adhesive labels or polyester-based labels, we will need to purchase a thermal printer with 300 dpi resolution. The Datamax series are typical, and I recommend the Datamax E-4305A Printer that does both direct thermal and thermal transfer printing. In fact, we could easily accommodate the Data Matrix code onto a printed slide label along with the identification label. It could also be used to print the locality labels as they are needed, avoiding having to print them out in sheets using the current system that is in place.

Price for the Datamax E-4305A printer is $430

Thermal-transfer ribbon for slide labels is $115.00

Special XyResist permanent adhesive labels vary in price depending on size and quantity. They are cost-effective and the best solution for cryovials, slides and ethanol specimens.

There is not a lot of support for MacOS in the barcode world, since most of the applications are via the Windows platform. There are readers that work with mobile devices and MacOS, but production of bar codes depends on using Windows apps and hardware.

Barcode readers come in many sizes, types, and prices, but budgeting about $250 per reader is appropriate. Integration of a barcode into the data capture phase is usually very simple, as the readers act as a driverless input device for a spreadsheet cell, database field, etc. The user goes to the field and captures the barcode with the wand, and the alphanumeric appears in the field.

Vendors:

http://www.barcode-labels.com/solutions/asset-labels/barcoding-bugs

http://www.labtag.com/

http://www.barcoding.com/

http://www.barcodebonanza.com/

Resources:

http://www.idautomation.com/#fonts

http://www.biology.ualberta.ca/bsc/briefs/brlabelstandards.htm

http://www.adams1.com/etiquetas.html

http://www.discoverlife.org/pa/or/idp/OVERVIEW/barcodes.html

http://www.uaf.edu/museum/collections/ento/projects/

http://www.akentsoc.org/archives/295

http://nmnh.typepad.com/department_of_entomology/2014/01/the-entomology-collections.html

http://www.barcode-labels.com/solutions/asset-labels/museum-labels