The case of using microsatellite genetic data to rescue an isolated indigenous African lion population at the Hluhluwe-imfolozi Park in Kwazulu Natal Province, South Africa

Key points:

1. The open sharing of microsat data allows others to check my analyses and do more analyses if new statistical analyses are developed.
2. The sharing of datasets enables the reproducibility of science as “anyone that had the data could also get to the same conclusions I came to especially if they read the paper and use my data”.
3. Microsatellite genetic data can be loosely used to compare data when stored in an open access repository.

Free-roaming adult male lion (Panthera leo) on a game reserve in South Africa. (Online). Accessible: https://commons.wikimedia.org/wiki/File:Adult_male_lion.jpg

Dr Susan Miller, a Post-Doc Fellow at the Fitzpatrick Institute of Ornithology at the University of Cape Town, recently deposited a very interesting dataset in ZivaHub, UCT's institutional Figshare repository. It contains microsatellite data and genetic data from a population of lions at the Hluhluwe-iMfolozi Park in Kwazulu Natal. The data was deposited as supplementary material for a paper published in Conservation Genetic on the 'Genetic rescue of an isolated African lion population.' The raw microsatellite data records lions (Panthera leo) in Hluhluwe-iMfolozi Park (HiP) KwaZulu Natal, South Africa. The lions were sampled from three populations:

1. original HiP lions,
2. lions that were translocated into the population in a genetic rescue effort in 1999-2001, and
3. lions after the genetic rescue collected between 2009-2014.

The problem identified was that a population of lions established in Hluhluwe-Imfolozi Park in the late 50s and 60s had become inbred by the early 90s. When it was realised that they were inbred, more lions were introduced in a genetic rescue effort. "So we collected blood and tissue samples after several generations in 2009-2014," Susan says. The data gathered were three-tiered, consisting of the data for the 'before' (i.e. those which were present before the genetic rescue effort), the 'translocated' (those that were brought in), and the 'after,' to see if the translocation had been successful in improving the genetics of today's lions. Samples Susan had previously gathered from the Kruger National Park in Mpumalanga were used as a control group.

Susan points out that "microsatellite data on its own is sort of useful to other researchers and sort of not... You can use the same microsatellites for another project, but if you use a different machine, you have to calibrate the samples or send the samples to where I sent mine to run the same process to be able to do direct comparisons with the data."

When asked about what prompted her to publish her data in ZivaHub, she responds that, while some researchers in her community do use Dryad, the disadvantage of this is that the service is not free of charge. However, the journal Susan submitted her publication to had merely stipulated that the data should be stored in an open access repository. At this point Susan logged into ZivaHub and pre-reserved a doi for her data. Only later, when the journal actually published her article, did she realise that she had not yet made her data publicly available. Susan remembers: "Suddenly I was in a rush to make it public! So I just hit 'publish' and 'save.'" Dr Patricia Chikuni, Data curation officer at Digital Library Services at UCT Libraries received the curation request and was intrigued by the title of the dataset. She wondered in what context the data had been collected, as Susan had not yet provided a full description, made contact with Susan to assist with enriching the metadata.

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Asked what she thinks about open data sharing in general, Susan says "I think we should do more of it, especially in conservation studies, where there is little money." Although more and more people are now using SNPs, Susan's study demonstrates the value of openly sharing microsatellite genetic data to compare results. Microsatellites are used to understand population genetics, and to assess levels of inbreeding using comparative populations. They also help to determine the parentage and relatedness of lions for translocation or removal and contraception.

Check out Susan's data at:
Miller, Susan (2019): Microsatellite data for HiP lions. figshare. Dataset.
https://doi.org/10.25375/uct.9505409