

DLC Weight File Variable Descriptions and Usage Notes

Table 1. List of taxa included in the data files, including taxonomic code used in all data files (Taxon), Latin name and common name of each taxon^{4, 5}.

count	Taxon	Latin_Name	Common_Name
1	CMED	Cheirogaleus medius	Fat-tailed dwarf lemur
2	DMAD	Daubentonia madagascariensis	Aye-aye
3	EALB	Eulemur albifrons	White-fronted brown lemur
4	ECOL	Eulemur collaris	Collared brown lemur
5	ECOR	Eulemur coronatus	Crowned lemur
6	EFLA	Eulemur flavifrons	Blue-eyed black lemur
7	EFUL	Eulemur fulvus	Common brown lemur
8	EMAC	Eulemur macaco	Black lemur
9	EMON	Eulemur mongoz	Mongoose lemur
10	ERUB	Eulemur rubriventer	Red-bellied lemur
11	ERUF	Eulemur rufus	Red-fronted brown lemur
12	ESAN	Eulemur sanfordi	Sanford's brown lemur
13	EUL	Eulemur	Eulemur hybrid
14	GMOH	Galago moholi	Mohol bushbaby
15	HGG	Hapalemur griseus griseus	Eastern lesser bamboo lemur
16	LCAT	Lemur catta	Ring-tailed lemur
17	LTAR	Loris tardigradus	Slender loris
18	MMUR	Mircocebus murinus	Gray mouse lemur
19	MZAZ	Mirza coquereli	Northern giant mouse lemur
20	NCOU	Nycticebus coucang	Slow loris
21	NPYG	Nycticebus pygmaeus	Pygmy slow loris
22	OGG	Otolemur garnettii garnettii	Northern greater galago
23	PCOQ	Propithecus coquereli	Coquerel's sifaka
24	PPOT	Perodicticus potto	Potto
25	VAR	Varecia	Varecia hybrid
26	VRUB	Varecia rubra	Red ruffed lemur
27	VVV	Varecia variegata variegata	Black-and-white ruffed lemur

Table 5: DLC Weight File variable descriptions

count	Weight File Variable Name	Weight File Variable Definition
1	Taxon	Taxonomic code: In most cases, comprised of the first letter of the genus and the first three letters of the species; if taxonomic designation is a subspecies, comprised of the first letter of genus, species, and subspecies, and hybrids are indicated by the first three letters of the genus. See table 1 for details.
2	Hybrid	Hybrid status: N=not a hybrid. S=species hybrid. B=subspecies hybrid. If sire is one of multiple possible and animal could be a hybrid, it is designated a hybrid.
3	DLC_ID	Specimen ID: Unique DLC number assigned at accession of animal
4	Sex	Sex: M=male. F=Female. ND=Not determined
5	Name	House name: Animal name assigned at DLC

6	DOB	Date of Birth: DOB is exact unless there is an entry in the "Estimated_DOB" field.
7	Estimated_DOB	Date of Birth estimate: Whether or not the date of birth is an estimate. Y=estimated to the nearest year, M to the nearest month, and D to the nearest day. If there is a number after the letter code, that indicates to the Nth value of the code. U=unknown. If there is no data in this field, DOB is not an estimate.
8	Weight_g	Weight: Animal weight, in grams. Weights under 500g generally to nearest 0.1-1g; Weights >500g generally to the nearest 1-20g.
9	Weight_Date	Weight date: Date animal was weighed
10	MonthOfWeight	Weight month: Month of the year the animal was weighed
11	AgeAtWt_d	Age in days: Age of the animal when the weight was taken, in days (Weight_Date-DOB)
12	AgeAtWt_wk	Age in weeks: Age of the animal when the weight was taken, in weeks ((Weight_Date-DOB)/7))
13	AgeAtWt_mo	Age in months: Age of the animal when the weight was taken, in months (((Weight_Date-DOB)/365)*12)
14	AgeAtWt_mo_NoDec	Age in months with no decimal: AgeAtWt_mo value rounded down to a whole number for use in computing average individual weights (FLOOR(AgeAtWt_mo))
15	AgeAtWt_y	Age in years: Age of the animal when the weight was taken, in years ((weight date-DOB)/365)
16	Days_Since_PrevWt	Days difference: Difference, in days, between the date of this weight and the date of the animal's previous weight
17	Change_Since_PrevWt_g	Weight difference: Difference, in grams, between this weight and the animal's previous weight
18	Avg_Daily_WtChange_g	Average daily change: Average daily weight change, in grams, between this weight and the animal's previous weight
19	DOD	Date of death. Verified date an animal died. Missing indicates animal is either alive or status is unknown.
20	DaysBeforeDeath	Days before death: Number of days before the animal's death the weight was taken (DOD-Weight_Date). Missing indicates animal is either alive or status is unknown.
21	Birth_Type	Type of birth: Whether the animal was captive born (CB), wild born (WB) or of unknown birth type (UNK)
22	Birth_Institution	Birth institution: Name or ISIS abbreviation of institution where animal was born. Duke Prim=DLC. For wild caught animals, birth institution = country of origin, if known.
23	Litter_Size	Litter size: Number of infants in the litter the focal animal was born into (including focal animal). Only indicated where verifiable (born at DLC). A missing value indicates that the litter size is unknown.
24	R_Min_Dam_AgeAtConcep_y	Dam minimum age at conception, in years, for the species from the life history summary table. Used to calculate "Age_Category" as described below.
25	Age_Category	Age category: IJ (infant or juvenile): (AgeAtWt_yr<R_Min_Dam_AgeAtConcep_yr). Young-adult: (Min_Dam_AgeAtConcep_yr<=AgeAtWt_yr<2xMin_Dam_AgeAtConcep_yr). Adult: AgeAtWt_yr>=2xMin_Dam_AgeAtConcep_yr
26	Current_Resident	Resident status: Whether or not the animal currently lives in the DLC colony
27	Preg_Status	Pregnancy status: Whether or not animal is pregnant on date weight was taken. P=pregnant, NP=not pregnant (all males coded NP)

28	Expected_Gestation_d	Expected gestation length: Values based on DLC observations and reports from the literature, in days
29	ConcepDate_IfPreg	Conception date: Estimated date of infant conception if the weight was taken while a female was pregnant
30	InfantDOB_IfPreg	Infant Date of Birth: Date of infant birth if the weight was taken while a female was pregnant
31	DaysBeforeInfBirth_IfPreg	Days until birth: Days remaining in the pregnancy if the weight was taken while a female was pregnant
32	Pct_PregRemain_IfPreg	% of pregnancy remaining: Percentage of pregnancy remaining when weight was taken from a pregnant female calculated as (days_BF_inf_birth/Expected_Gestation)
33	InfantLitSz_IfPreg	Infant litter size: Number of infants in the litter a female produced if she was pregnant on date weight was taken

Usage Notes

Wild vs. captive populations

All data presented are from captive individuals and may not necessarily be representative of wild population values, particularly for some variables. For example, we expect that longevity in captive populations will exceed that of wild populations in most cases due to lack of predation and access to veterinary care in the former. Reproductive variables that are affected by variation in resource availability may also differ as captive populations have continual access to species-appropriate diets with no seasonal or yearly scarcity. Similarly, body mass may be higher in captive populations because they are never resource-challenged. In some cases, the degree to which captive and wild data concur will vary by species and will be affected by sample sizes and methods of analysis. We therefore warn against using these captive-derived values to *directly* assess life history variables in wild populations, but suggest that researchers may be able to use them as *relative indicators* of life history variables in wild populations with caution.

For example, a comparison of body mass variables in this dataset to those for wild populations extracted from the literature for 20 lemur species¹⁴ reveals that across all species, average adult body masses at the DLC are 19% higher than averages for wild populations summarized from the literature; half of the species are fairly comparable to wild body mass (DLC animals are -1% to +11% heavier), with the other half showing greater discrepancies (DLC animals are +18% to +52% heavier). However, there are some factors that may explain some of the variability. First, in the captive data, we differentiate between adults and young adults, which would have a tendency to increase the DLC average compared to wild estimates from the literature if those contain many young adult individuals. Second, 6 of the 10 more discrepant species are flagged as having “large variation in measurements relative to mean body size” in Table 1 of Taylor and Schwitzer¹⁴, indicating that those averages may vary seasonally, by population or by study. Finally, the most discrepant species (Eful at 52%) is so distinct from the DLC values that we suspect the possibility that two different subspecies or quite distinct populations have been measured. If all of the cases of questionable data are excluded, the DLC animals are on average 12% heavier than wild populations. Thus, while a fine scale assessment of body size in wild populations cannot be derived from the DLC data, a comparison one species relative to another may provide insightful results.

Breeding seasonality

All breeding and birth season data are for the captive colony in North America, and are seasonally opposite of breeding and birth seasons in Madagascar, which is home to all wild lemur populations.

Timing and success of reproduction

There are some analyses that should **not** be conducted with these data because of factors associated with captive breeding management. Breeding is very strictly managed, so *individual* ages at reproduction do not give a true indication of a) individual variation in minimum, maximum, or mean age at reproduction or b) inter-birth interval. If a female does not conceive until well into adulthood, it is much more likely that she wasn't allowed to breed than that she wasn't able to breed. Because the sample sizes are large in most cases, we do feel that *species* values for the minimum and maximum ages at reproduction are reliable and as such, they are provided in the life history table.

In the DLC Animal List data file, there is a variable named "N_Known_Offspring" that indicates the number of offspring in our records for that the individual is known to have parented. This should not be taken as a measure of relative reproductive success. In other words, dams with more known offspring are not necessarily more reproductively fit than those with fewer or no known offspring, and it may simply be that the former were given more reproductive opportunities based on management strategies. In addition, some of the offspring counts may be underestimates because a) some individuals may have had offspring at other institutions that are not accounted for in our records, and b) in cases where there are multiple possible sires of an offspring, that offspring is not counted for any of the potential sires.

Longevity

In some cases with small numbers of uncensored data points, a median longevity could not be calculated because the proportional hazards curve never drops below 50% survivorship. We see this for the aye-aye females, where the oldest female death is still young relative to other data points. As older aye-aye females die over time, these values will be able to be calculated.

Body mass: seasonal variation

The body mass summaries in the life history table are based on all weights, regardless of season in which they are taken. There is seasonal weight variation in some species, and it is particularly striking in the small nocturnal mouse and dwarf lemurs, where average summer weights (Mmur: Apr-Sept; Cmed: May-Oct) are significantly lower than the average winter weights (Mmur: Oct-March; Cmed: Nov-Apr). If the data are being used for a project that is sensitive to this, users should parcel weight data from the Weight File based on the "MonthOfWeight" variable and use subsets accordingly.

Hybrid animals

The known *Eulemur* hybrids are a mix of between two and five of the following species: Ealb, Ecol, Eful, Eruf, Esan, and Emac. *Varecia* hybrids are a mix of Vrub and Vvv. Hybrid status is entered in ARKS and in cases where hybrid status is unknown, data output

indicates a hybrid status of “N” (not a hybrid). There are 16 animals identified taxonomically as *Eulemur* hybrids that are potentially not hybrids because at least one potential sire is of a species that matches the remainder of the animal’s ancestry (DLC_ID’s 5801, 5802, 5933, 5934, 6087, 5553, 5554, 1574, 2513, 2550, 2551, 3527, 3561, 1554, 6212, 2566). These animals are identifiable in the output because their taxonomic code (Eul) indicates a hybrid animal, but their hybrid status is “N”. ZIMS *can* produce output indicating “hybrid status unknown”, so these entries will be adjusted once the migration from ARKS to ZIMS is complete.

Additional data, updates, and project information

Interested users may obtain additional access to these data files and future updated versions of data or other DLC project information as follows:

1) Direct download. As outlined above, data records are available in Dryad. Users may also download data files by connecting to the Duke Lemur Center web site (<http://lemur.duke.edu/discover/for-researchers/>) and navigating to the “historic animal data” page where they will be guided through a brief registration (free) and then be connected to the download page. There are no costs associated with these data downloads. The download page is where future updated versions of the data described here will reside, and updates will also be deposited in Dryad on a yearly basis.

2) Specified data file requests. To inquire about or request a specific dataset that may include information not presented here, please contact corresponding author and DLC data manager, Sarah Zehr, at sarah.zehr@duke.edu. There is currently no cost for such requests, but fees may be implemented in the future to offset the cost of database maintenance.

3) Live animal or biological sample projects. For more information about use of the live DLC colony or acquisition of biological samples, please go to the Duke Lemur Center web site (<http://lemur.duke.edu>) and navigate to the research page to find more information about these classes of research, as well as contact information for the DLC Research Manager who oversees them. There are fees associated with both live animal use and biological sample purchase.