



r j qj crkaf k ii m oa j j ckrdf ky o o; wj  
j j c go r q r o i fw Z f k d j t f e j r o  
j c Z j fw def f j j a j a j k Z r f k d l j j c a t j  
f k o Z j fw j a f k d f j m j o u f j c Z j k k ' l l d  
s o j k k S j e r g r o k r e e e  
Z j l o i r i a f k d e o f r j w j o d o f j k j c  
Z k o j o d f k a f w f k f a j o o f r j d o o f j  
e s Z k s d f f a q j d f k a j d r o s i r l c c q  
j k m o j f k a j l j m o q o e r r j c r k g r a Z j  
q j e t f m o r j c r k s d f f k f f k f k f  
t e o f k o o e o e s m f f k f s m q o j e o  
m f j o e s o z o d f i j a f k f k m o j s f k j  
g r a f f k Z i q o r f o r e a f f k f t o o a w j  
q j m o s f j j o m o f f k u j c Z j j k f f k e k r  
j c Z j j k b e f m o j e r j e a k  
j o o f j k q o Z j fw t e e o s d f j o k j o m o k j  
j k f f k Z a o e k r k j o o a Z j j o j o m o k j  
s d j r r Z i e m o f a s a f f k t e f e o Z j k  
o d o f j k j c f w g r a j Z j f j k g r i s i r l c c q  
j k m o j f k j Z f k w j j i d s d f k o  
i s k o o k f o j s d f k o  
m f e e i i m o r k d a j r d d a f k e a f k f o  
f k m o m f a q o m f j e o e k e j q o t e f e e  
f k u t s m e m i i k o f j k s o Z j o  
j s o f k u m f Z i t f e f k m f j s o Z j u  
m o f k d a j j o d j m f a Z s d a f j k f k  
a j d l d o m e f o k j o j l f i i o a q o j k  
d o m o r k d a j b e r f j f j k j e  
r j c s f a f k f a r d d a e a e r j c r k s d f  
f k f f a r a f j k Z i k d d s o i t e j o e s a f j k  
d f k a e f o r d o j o j k o j o m o r k d  
a j i s k o o k f o j  
k e f m o t r a w j j s o i t a o q t i m f  
q j s i r a e r j c s d j r j j k i m f f k f  
f k f a j o j c m f m o j f k j o k r j Z o j c o j k  
t a o q t i o r c r i a u a j r q o e f u o f f o u  
k r j o j a r f e s u j f k s d a f j k k Z j k f  
a f j k e o j d e j a e k k r i c i o r f k f k a f Z i  
a a t e o g o r q r o j j r o k a j a Z j m o j f k  
k m f e s b Z k a o j f k j i t a o  
q t i a r s f e j t i o o a q 5 e 5 j

5 5 s Z i i i m o j d 5 t a o c a j

noju qo d] i k Z r d i Z j t r k s f i  
Z q o r k r i j k  
Z j o e n f t r e s f i Z i q r o j o u l  
Z j w j q d q j k q o r q e d o m d k f j j k k i  
Z j k q e j o o i f j k j q d u a j m d k f i  
j m k k j f k a f t j i f k d q o  
m k j f i k k t f d l k t o m j f s i j o o i q t f e u  
j o e l d f i j j t o o d j c i f k d 55  
k 5 j a j i s d k o m g s j i f k d q o  
e o i a r k t m j f s i j o o i q t f e j t o j c r i j k  
k q o r k j i f k j o o i q t f e j t o j c r i j k  
k i f j c j i k c j i j k j a j i s d k e k e  
j o o i q t f e q o r Z r d j d f Z k d a f s j o o i f j k  
t f e r i j k i f k d a f s j o o i f j k  
s d k q o j i k c j i o m g s i j c a j i  
r a f j a q j i Z c a c a k e o i k c i  
f m o j f j a m o j f k r f k d a k o m o j f j a Z j  
j m j f k k i k Z d c o j t o d e l j  
d k w j k f t u o a a j r Z j m i r f k d  
m q o j r j e o f k j e i q m o a r j Z r e a j  
j 5 r i q o j f k c e o j d e j Z r f j c m f j o  
j a d i f k j r a i c o k j q o i e a j a o f k  
m o j a f j k j c m o j f k k j f k o i k k k a j k  
f k a e j m j f j k j a e r Z j m i a j e o j j a e  
j o o j f k u f c o k e f k e t j j c d j k  
Z r f k j i j m i s o f j k j c a f a f k q o j f j k  
d j d j % r o k e j k k o j k a j j o a  
j j t f e u a o j d f k a k a r i j k j j i e  
j j a m o j j r j j j a e c k f a a e a f a e  
j j e a Z a d j e a t f e j j s o m o j a d w a f k  
t f i e s e j t a k e f d e t t f e q t f j k  
a j



r s i m m o f a s j j i j c Z i r a c a k  
m o j f k q o i i m f r f k d j o f k o i a a r o  
o d o f j k j k a f t j i f k i r f k d  
j d q o k q o j Z j k q o r r o i j r o j k d  
f k m k k s d Z i o j a f c r j m a f j k j c f k d i  
k e l l j a f r r k d j j j a d e s d Z i f k l f o  
k i t j j l d q o k q o e a f j a s i r j c  
c a k m o j f k  
j o m f j f i m k t f d j k t j k f o j j i  
e a f k i r j k i Z j d j Z j j o + j k i  
j o e j a d e f e o j o r r i j k t f k d e j o j o Z j



Table 2. Reli e mea e f m del i ( <sup>2</sup> ) f m ege i n f FAT ( al li id) and PROT ( al ein) again indice (b d ma , a i

M del <sup>a</sup>	S ecie											
	N he n in ail		Le e ca		Ame ican i ge n		Ha le in d ck		ga ' g ldene e			
	%FAT	%PROT	%FAT	%PROT	%FAT	%PROT	%FAT	%PROT	Female		Male	
	%FAT	%PROT	%FAT	%PROT	%FAT	%PROT	%FAT	%PROT	%FAT	%PROT	%FAT	%PROT
Ma	0.46	<0.01	0.19	0.08	0.18	0.11	<b>0.78</b>	<0.01	0.16	<b>0.12</b>	0.19	<b>0.01</b>
Ra i :												
Ma /Ta	0.43	<b>0.08</b>	0.21	0.10	<b>0.31</b>	0.18	0.50	0.02	0.01	0.02	0.10	0.01
Ma /C lmen	0.43	0.06	<b>0.22</b>	0.05	0.13	<b>0.22</b>	0.66	<0.01	0.04	<0.01	<b>0.2</b>	<0.01
Ma /Wing	0.45	0.02	<b>0.14</b>	<b>0.16</b>	0.23	0.15						
Ma /g d	0.44	0.04	0.12	0.12	<b>0.31</b>	<b>0.22</b>						
Re id al :												
Ta	0.49	0.02	<b>0.22</b>	0.10	0.20	0.12	0.52	0.02	0.24	0.12	0.11	<0.01
C lmen	0.49	0.02	0.20	0.08	0.18	0.10	0.75	<0.01	0.19	0.11	0.18	0.01
Wing	0.48	0.01	0.18	0.12	0.24	0.15						
g d	0.48	0.02	0.14	0.11	0.28	0.19						
Ta +C lmen+	0.52	0.05	0.16	0.13	0.24	0.12						
Wing+g d												
PC1	<b>0.53</b>	0.05	0.19	0.14	0.29	<b>0.22</b>	0.75	<0.01	<b>0.25</b>	<b>0.12</b>	0.14	<0.01
Ta +C lmen							0.42	<b>0.03</b>	0.14	0.10	0.10	<0.01

Table 3. Reli e mea e f m del i ( <sup>2</sup> ) f m ege i n f %FAT ( al li id x b d ma <sup>-1</sup>) and %PROT ( al ein x b d ma <sup>-1</sup>) again indice (b d ma , a i e id al) f i e a e f l ecie . Ra i indice incl de b d ma di ided b c al mea e . Re id al indice a e ba ed n he i fam del f %FAT %PROT b he e id al fam del fb d ma a a f n c i n f he a i c m b n a i n f c al mea e . Val e h n in b ld e den e h g e <sup>2</sup> am ng indice c n ide ed i h i n a ecie and i e e .

M del <sup>a</sup>	S ecie											
	N he n in ail		Le e ca		Ame ican i ge n		Ha le in d ck		ga ' g ldene e			
	%FAT	%PROT	%FAT	%PROT	%FAT	%PROT	%FAT	%PROT	Female		Male	
	%FAT	%PROT	%FAT	%PROT	%FAT	%PROT	%FAT	%PROT	%FAT	%PROT	%FAT	%PROT
Ma	0.46	<0.01	0.19	0.08	0.18	0.11	<b>0.78</b>	<0.01	0.16	<b>0.12</b>	0.19	<b>0.01</b>
Ra i :												
Ma /Ta	0.43	<b>0.08</b>	0.21	0.10	<b>0.31</b>	0.18	0.50	0.02	0.01	0.02	0.10	0.01
Ma /C lmen	0.43	0.06	<b>0.22</b>	0.05	0.13	<b>0.22</b>	0.66	<0.01	0.04	<0.01	<b>0.2</b>	<0.01
Ma /Wing	0.45	0.02	<b>0.14</b>	<b>0.16</b>	0.23	0.15						
Ma /g d	0.44	0.04	0.12	0.12	<b>0.31</b>	<b>0.22</b>						
Re id al :												
Ta	0.49	0.02	<b>0.22</b>	0.10	0.20	0.12	0.52	0.02	0.24	0.12	0.11	<0.01
C lmen	0.49	0.02	0.20	0.08	0.18	0.10	0.75	<0.01	0.19	0.11	0.18	0.01
Wing	0.48	0.01	0.18	0.12	0.24	0.15						
g d	0.48	0.02	0.14	0.11	0.28	0.19						
Ta +C lmen+	0.52	0.05	0.16	0.13	0.24	0.12						
Wing+g d												
PC1	<b>0.53</b>	0.05	0.19	0.14	0.29	<b>0.22</b>	0.75	<0.01	<b>0.25</b>	<b>0.12</b>	0.14	<0.01
Ta +C lmen							0.42	<b>0.03</b>	0.14	0.10	0.10	<0.01

<sup>a</sup>Abb e ia i n f m del a ame e : Ma =b d ma , Ta =diag nal a , C lmen =c lmen leng h, Wing = ing ch d, g d =b d leng h, PC1 =fi inci al c m nen .

lo ii m a fw gr j k u j Z j o r j f k  
do a o m o f f k l c c u l o m o j f k a f a u l s o e a l c  
Z j j k t e f e f f k a k f k e o k c r k a f k j c  
j f k m o j a o a l o d o f k j l e f e l t s o e  
r d e o t f e l k i a t l j u m f j k o j e i c a j c  
t f d l j e Z j i q f j m o s j k f k o t ≤ q o  
Z j e c a k m o j f k l t s o m o f a s a r a f k  
m i f k j l o a g a l e f e m o k d j c s d a f k f k  
m o j f k o j m f d e l j d e t f e e u m f j k j c  
e o i a r k e f k a r f j k l c j o e j a d f k m o f a s  
j l i m r k y q o l k i 5 5 l a e s d a f k f k c a  
o j m f b e r k s t f e j u t k a r b f f j c c u l o  
m o j f k e m j u k i f j m o s j k u j m o f f k f e f e j  
s d Z j Z j l a k i t k f k k o j g r a f d g o Z j  
f w m i f k j k i a r a o a j e t c j e s d a f k f k c a

k l c e f k f r f k e i o a r o o t e a t o c o  
a j r k s d e f k f e o e a f e o k l u s f a j o  
a a d f k a a j t k s i r l c c a k m o j f k k o Z  
m f f k o e r j m f k e a g r a f d Z j j o  
j r o l c a o r a r o i f w f k k o z a o o k k o o r j f k  
j j o m o f f k u l c Z j j k f k e k r j l c Z j  
o a r k j s f i j  
k j l o a j m o f a s a r a f k t e e o k f k s a f  
d a j o f f k o a f k f e o Z j i t m o o k a f r s i r  
j j r k f d g o g o r a t o j f w f k f k f l a j k f k u  
f m o s m o f a s Z j o i a s a j Z j j k  
j l i d f k f Z j j a f j a Z j i t m o j f k  
a r i d t i i j o j o m o f i Δ = <  
e k j e o f k f t j k f o k e r j r i Z  
o d o e Z j m o f j o l c Z j i t m o j f k o j  
m f l t s o f k f m o f a m o k m o j f k m l o j  
k t f e j k f o Z j j o s d Z j f f i o e Z j  
j c f k f a l m o f a Z j i t m o f k a o i c a t e f e j  
j d Z j j f a k t f e m o f k a o i e f e Z a  
j j i g o r a o f k i r o k i s d f o j m f k  
u j m a k i t e e o a f a r k s i r l c c a l o  
m o j f k j g r a f d j e o Z g o r a o f w l a k a t i i  
o t e j j i d a f k c t a r g l a k a i i  
r a e o f m o s j k u j o Z r f k f e o o a f j o  
o f r i f k u t o k d i d Z i t e k j m o a j g r a f k d  
e i Z j k e a e f j r o o r d j j l a o a e a e  
r j m f j k e a f w g r a Z j j f k f o j o  
m o f e k f o j j o l c Z j j f k u r k s o i i  
s f  
m o s f j k o a f k j c r o o r d e o j r e  
e m j e a f i u j m j k o a f k j c r o o r d e o k d i t e o  
j m j l c i o m t o m a r o t f e j o k  
j r o l c e o r i Z ≥ j c j k j j e j a d  
m f j o j Z k f k o i t f e e r i c j a l g a s l c  
o i a f d e f o f Z a r k o m o j r a s m o q o l a j e f o  
Z j i t m o j f k a e a f j l c m a r o f j  
Z o t f e j j o Z j i t m o j f k a e a f j o  
o e f a f k t a j j o a k f k u a j Z j

j k f f k r f k d a j i i g a i o i e o o r a f f k y  
a a j a r i j k f k u Z j k j j o k a j s f a r e k  
f k u b e r t o g o a j j a m o s f r i m r Z i e  
l o s d e f k u q o l o m f j r k s i m i i q o  
o j e o m f j o o z o d i j g r k l u t e m i i k  
f k u a j m d d r o o c i i j k f j l c i o m t k  
f m o s j d r o o i a s a j Z j j k j e l r e Z  
l k j o s e r t j f e a j d r i i j g e f m o s f r i  
m r Z i e f k u q o r f k l r o a r l t s o j o f d a j  
e o r d j f k o Z i e f f k u t e m j l o m o f j o  
j c c a j d f k f t a a q o i o m k  
e o g o c f j a l m o j s f r a r i f k u o i a s a j r f k d  
Z j i k Δ = - g o e f a r e  
f a c o k Z a t k l r o o r d j k e l l c t e m i i k  
o j k o k Z m d Z j a j e m f d e j c f k f  
a j a r m m r i a f k i l k f i i o e o m r a f d e  
r j o r k s o f d a i l k f i i o e o m r a f d e  
j a f k j c k f k u s i m g r a c k f f i o k a s j  
e a j i o A n a s p l a t y r h y n c h o s Z j e j f e  
r e a k % j k j d f k c f j a l m o j s f a j c r i  
f k u o i a s a j Z j j d f k Δ = m o j s f a j j r o  
j m j l c m r o c k i m f k t j r i Z a j o z o d i  
j g k f k u Z j k e m f j r o e a t o j i i g  
e o f r i j c a o d o f k f k o a j i j g  
a r Z i e f j a j r l i k f k u f k e i o a r o  
Δ d = - e f f k u r o c f i k u o i a s a j Z j  
e s i g e o l r o c Z j u j m i i t t j r i  
t r i e s j e o f f w m o l c f k o i a s d Z j a o r t e f e  
Δ = % j l c j r o d e s k e s f i Z i a t  
e s k j t l c k j t f k l c e Z s f k q o a f k r o  
m j f k f e f u l m j t a j j k o a e a f c k  
f k s a f a l o i a e j a a o a j s f a f w  
g r a f d a j Z j j e m f a f k l c r k s d e  
f k f f r Z j r k f k s a d a l o e j f r k o a k e  
m j u k f i j k a r k o j f a t f e e f r k a f k

e o m i f k f k f j r a m d f d e k e a o j  
j k f f k t e s e j t k f k f c k Z f k o a f k  
a o j l c Z j i t m o j a s m o m a f k l c m o j f k k  
m f l t s o l o o r d j k o a e a f k f l c  
Z j i t m o j f k k m f o l k r k l c  
e a f Z j e Z j i t m o j f k k m f t o m j f s i  
j o o j a t f e f k u s i r j o f k i f k o a a f k l c  
j i d f i o i a f k e m j f a t f e e f k f o  
f f r o j k k r k j o u j m j m j f s o i a f k e m  
Z a t k f k u k o m o j r a s f k s a j k j r i Z r  
a j Z j i t m o j f k f e o m f j o m o j f k j o e  
j j Z a f k j k s o j f k f a j m o m a f k l c Z j  
j t o m j l o o i a a l m o j k m o j f k e r o  
j o f o a j f k o a j Z j f k a o j e m o k f f o

fk sf r irk jrZ i on o ky Z i k j e o q f k k  
f f o o i j o u j m i q e q j d k j k k k c  
m o l d o s i j q o f f o o o r f o f k o f k  
q o f q r o i f w f f k o f k m o j f k k k  
o o i q o f f o o o e j m o j f a i j r o  
t f e f k j q f k f r i r e q e q f k o f k f f o o  
o r f o j o m k f k f k o f k q o r q r o m o j f k k  
j e o t j o d k f d j f w Z j j m f j o u f j c  
f f k m o j f k o o t e f e j s o o j q u j o  
o j j k j t f e f k q u o i j j t s o c t  
o o e o e s j d Z j o a j m q j e k Z j  
j k f f k f k q o j j c m f j i j j a f k j e o q f k k  
f f q e r r j c e q o j Z j j k f k k j f q j  
f k f o c o q j m e f j d f j q q q e q f j q j  
r k e k

o k i k e o f r i j r o l c Z  
J k f f k J o d k o q J o l c m r d j r o r j - J d  
m % i e j k j f k k  
f e l j j i i o k f i o i f j k e f j e r k d s t k o Z f j  
Z k j j i i o k f i o i f j k e f j e r k d s t k o Z f j  
r k o j k k j j c i f Z o a f f j k a f a f i a f c q  
j k o m k k j j c i f Z o a f f j k a f a f i a f c q  
- m f o e f j j % j j j j f f k l c t f k q k k k  
j e j k r Z a f k j r f f k j j f k k k t o f s j f j m f a f j k  
- j k l o s  
s o j k l o s k S j e j k o j f i j a f j a f k j m f j k k j  
j c k e f i i o k o j j f i j r o f k j - r f i j  
j e k j k d o m r f k a k j o