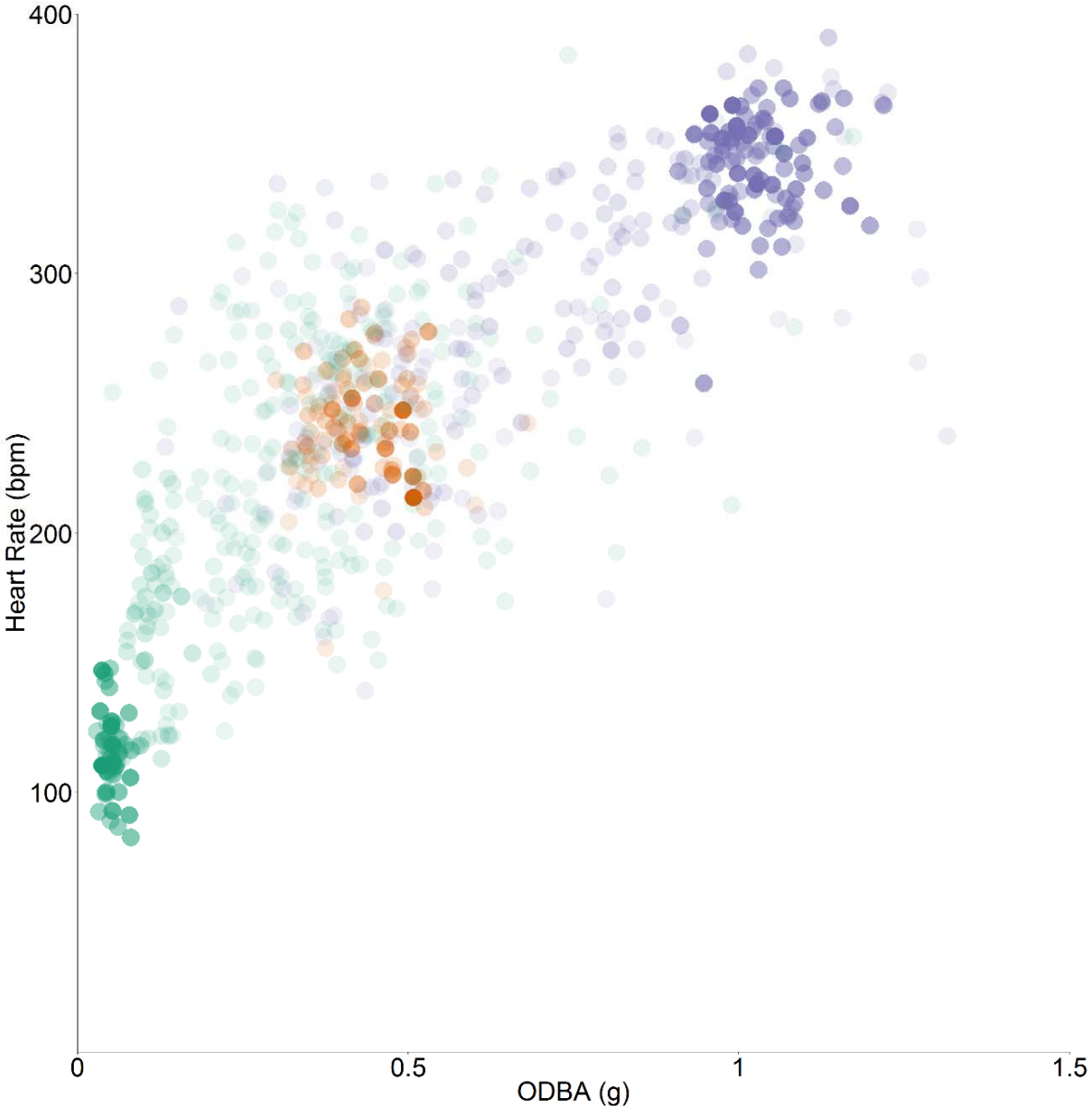

Fig. S1. The raw values of ODBA and Heart rate across different behavioural states. (Resting in green, diving in orange and flying in purple). Points vary in transparency according to the duration of time represented by each behavioural bout.

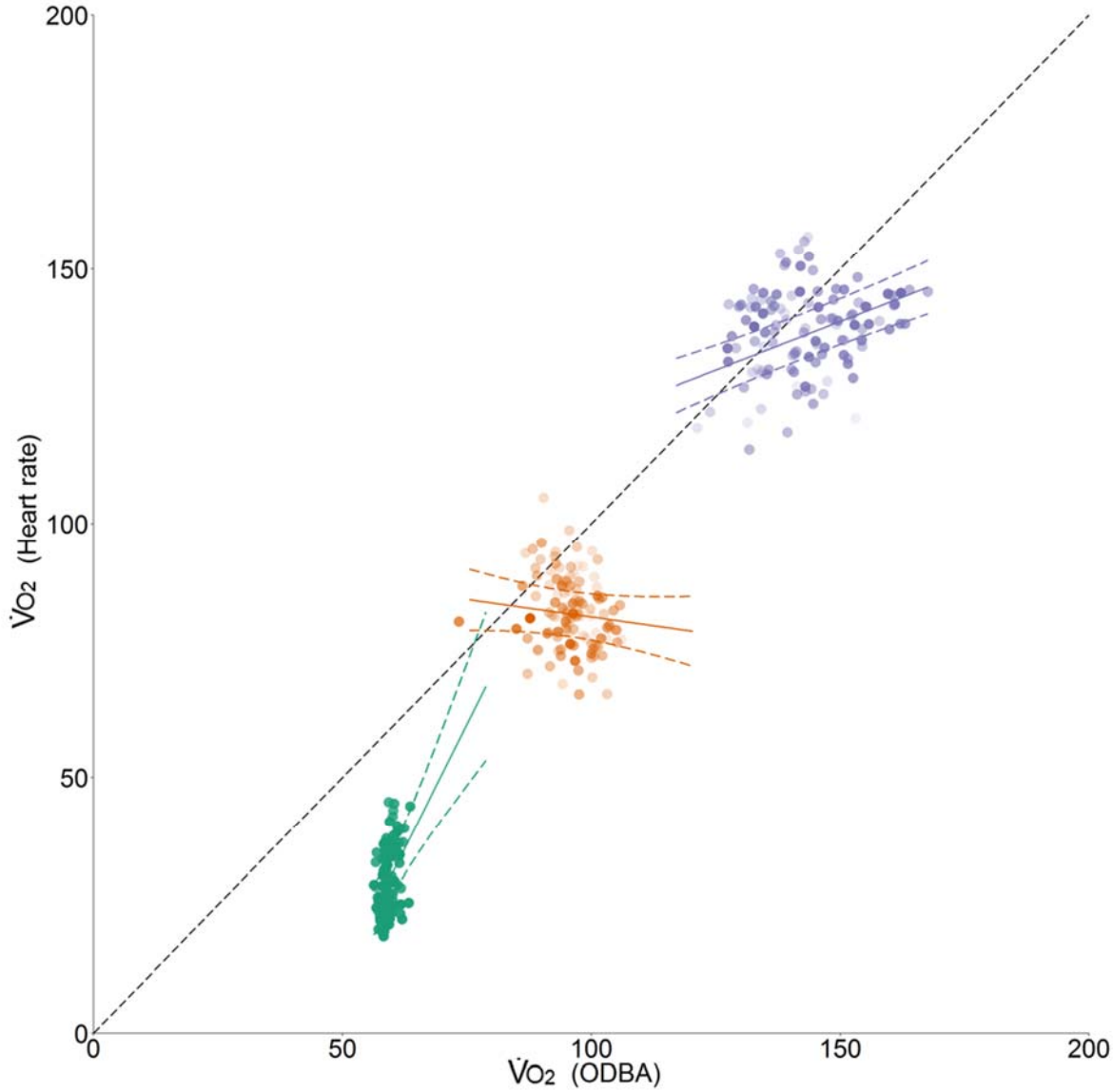

Fig. S2. The relationship between the two methods for predicting $\dot{V}O_2$ (ml min^{-1}) across different behavioural states at daily resolution. The dotted line represents equality between the two methods. Behaviour specific regression relationships (solid line) and 95% confidence intervals (dashed lines) for each behaviour (resting in green, diving in orange and flying in purple) are shown. Points vary in transparency according to the duration of time represented by each behavioural bout. R^2 for the best-supported model = 0.97.

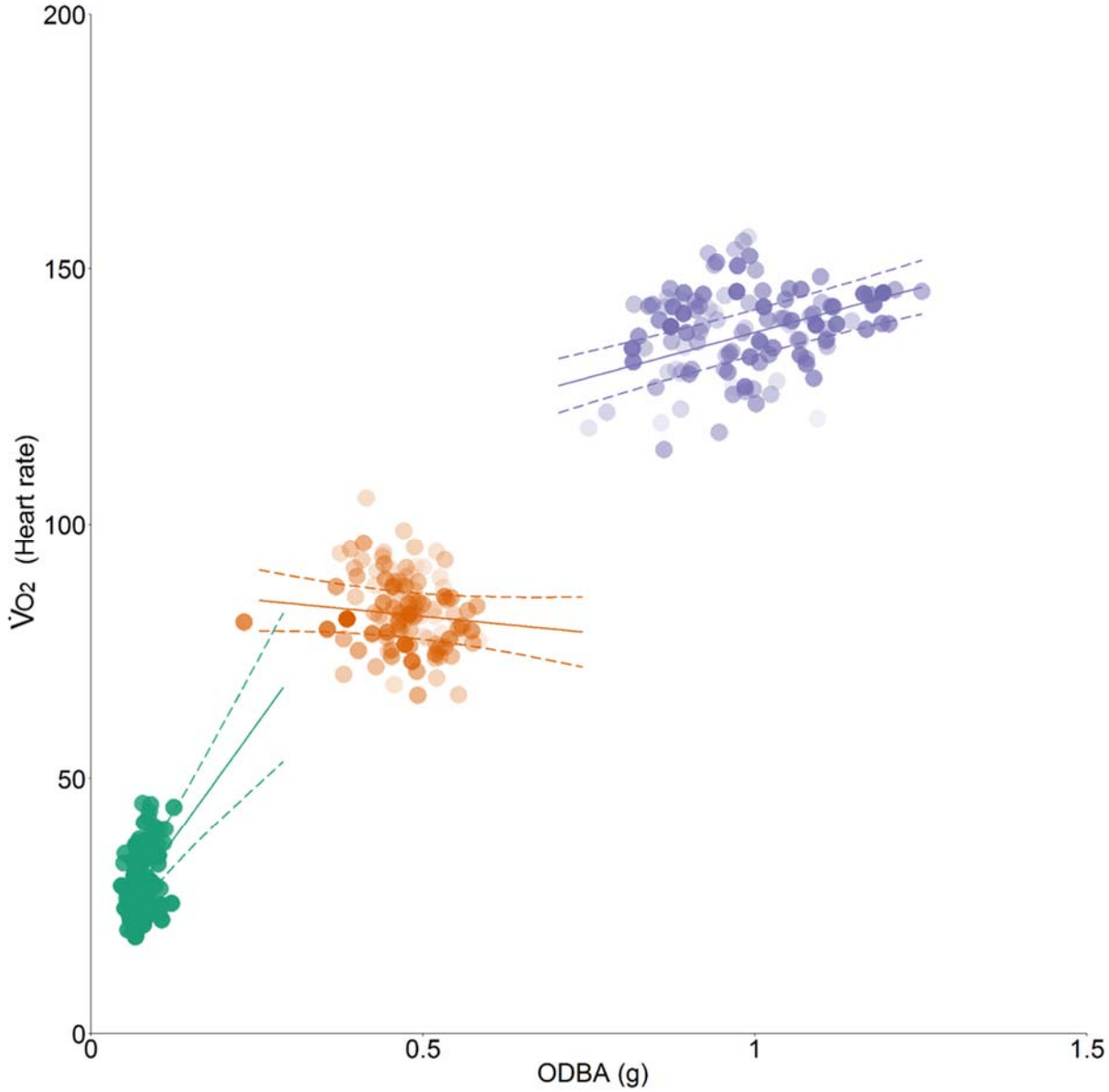

Fig. S3. The relationship between ODBA and *f*H derived $\dot{V}O_2$ (ml min^{-1}) across different behavioural states at daily resolution. (Resting in green, diving in orange and flying in purple). Points vary in transparency according to the duration of time represented by each behavioural bout.

Table S1. Predictive equations for Fig S3. for estimating $\dot{V}O_2$ from ODBA at daily resolution from LMMs along with R squared values for behaviour specific models.

Parameters		Predictions	R squared %
Resting $\dot{V}O_2$	=	(180.54*resting ODBA) + 15.698	14.6
Diving $\dot{V}O2$	=	(-12.72*diving ODBA) + 88.180	4.0
Flying $\dot{V}O2$	=	(35.17*flying ODBA) + 102.357	23.3

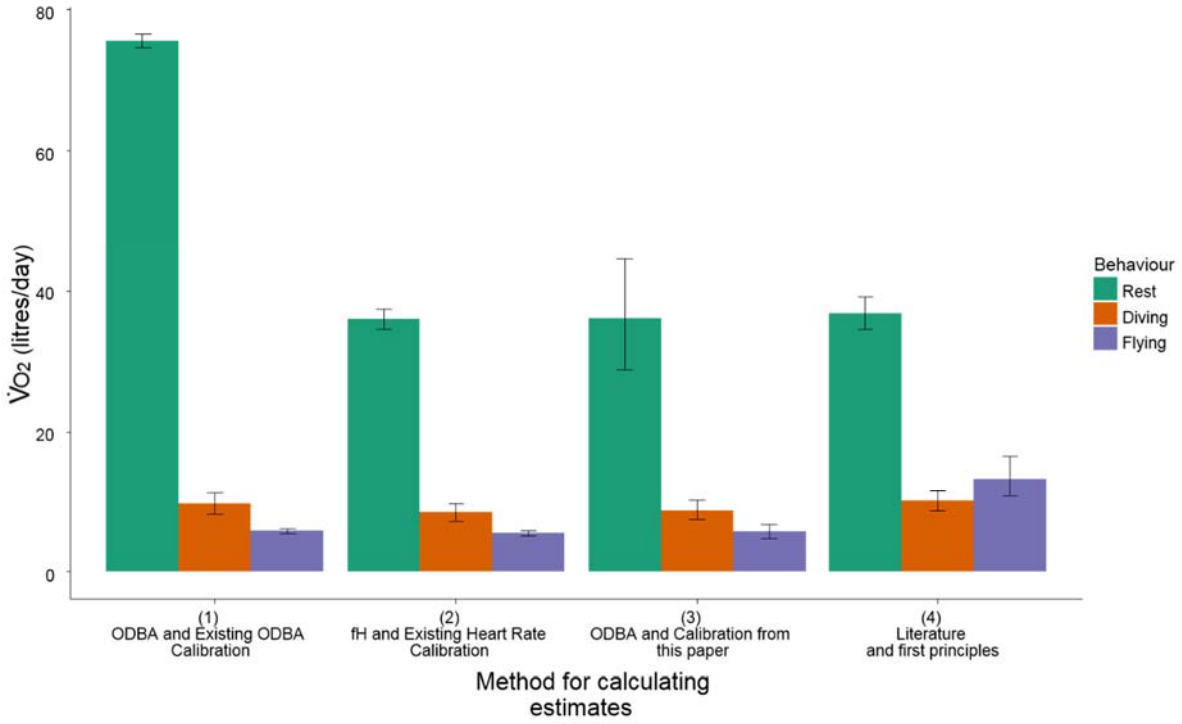

Fig. S4. Estimated total $\dot{V}O_2$ (l/day) for three key behaviours in European shags calculated using four different calibration approaches. Bars represent total daily oxygen consumption for each behaviour estimated by different methods. **(1)** ODBA values from the current study were converted to $\dot{V}O_2$ values using the calibration in Wilson et al (2006), error bars represent standard errors of the mean. **(2)** *f*H values from the current study were converted to $\dot{V}O_2$ using the calibration outlined in White et al., (2011), error bars represent standard errors of the mean. **(3)** ODBA values from the current study were converted to $\dot{V}O_2$ values using the calibration outlined in this paper; error bars represent 95% confidence intervals. **(4)** Values for rates of energy expenditure for rest and diving were taken from Enstipp et al., (2006b) rate of energy expenditure during flight was calculated using Vo_2 max calculation from (Bishop, 1997) based on heart mass, these were multiplied by mean daily duration of each behaviour from this study. Error bars are standard deviations.

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