80. Suitability of a triaxial accelerometer to monitor behaviour of goats at pasture (Eignung eines dreiaxialen Beschleunigungsmessers für die Bestimmung des Weideverhaltens von Ziegen). M. Moreau, S. Siebert, A. Buerkert and Eva Schlecht* – Kassel/Göttingen

Introduction: Many devices record behaviour of livestock at pasture, but they often only distinguish between activity *versus* inactivity and standing *versus* lying. A new device with the size and weight of a pocket lighter, intended for use in sports, may offer new possibilities to cheaply monitor grazing activities.

Methods: The Hobo® Pendant G triaxial accelerometer was tested on 2 adult goats on fenced pasture. The logging interval was set to 1s and the device mounted onto a broad belt around the chest (a), a chest harness (b) or a neck collar (c). Velcro-strips fixed the logger's position relative to the back (a), withers (b), or neck (c). On 12 days, the goats' behavior was observed every 10s during 4 hours and was interpolated to 1s. Head up/head down position was obtained from the inclination of the x-axis, the activities resting, grazing, and walking were discerned from the acceleration (g) of the x, y and z-axis. The change (d) in g of each axis was calculated for every second and merged with the observed behavior. The data was imported into a specially designed programme, which calculated moving averages for 1, 3, to 31 data points for dx, dy, dz. Threshold values for dx, dy and dz during resting, grazing and walking were calculated for the 16 moving averages and those with the best fit were selected for automated activity classification. If 3 or 2 axes indicated the same activity this was taken as the true behavior, otherwise the behavior indicated by the x-axis was taken. Data from one goat x harness type were used to validate the classification obtained from the other goat wearing the same harness.

Results: Due to a low number of walking bouts, the correct classification of this activity was $\leq$53%, while it was mostly >95% for grazing and $\geq$85% for resting. Across all data sets, >90% of activities were classified correctly. With the collar, head up/head down positions were detected with 97% and 99% accuracy during grazing, while only 77% of head down positions were detected in the resting goat. Head position detection was of similar accuracy when using the harness, but was not possible with the belt.

		Accuracy (%)of activity determination* (n in parenthesis)					
Test of harnesses	Activity	Neck collar		Chest harness		Chest belt	
Collar *versus* harness	Resting	88.4	(3642 9)	86.5	(3562)		
	Grazing	99.1	(9503)	98.6	(9454)		
	Walking	0.7	(5)	10.3	(71)		
	All	91.3	(13150)	90.9	(13087)		
Collar *versus* belt	Resting	97.6	(5065)			85.2	(4420)
	Grazing	99.9	(8846)			96.4	(8530)
	Walking	6.1	(22)			57.7	(207)
	All	96.8	(13933)			91.4	(13157)
Harness *versus* belt	Resting			91.6	(3938)	85.8	(3691)
	Grazing			98.0	(9565)	93.6	(9134)
	Walking			34.1	(116)	53.2	(181)
	All			94.6	(13619)	90.3	(13006)

*Accuracy = correctly determined 1s bouts of activity j in % of manually determined number of 1s bouts of activity j

Conclusions: Used together with the custom-made analysis programme, the tested accelerometer is very suitable for automated recording of goats' behaviour on level to slightly undulating pastures. Fixed on a neck collar or chest harness, it can detect head up/head down positions and thus distinguish, e.g., grazing from browsing. Its suitability in mountainous terrain and for species other than goats remains to be tested.

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