Phytochemistry, 1973, Vol. 12, pp. 1197 to 1198. Pergamon Press. Printed in England.

STRUCTURAL CARBOHYDRATES IN THE ARUNDINOID GENUS *CORTADERIA*

RAYMOND WELLESLEY BAILEY
Applied Biochemistry Division, Department of Scientific & Industrial Research, Palmerston North, New Zealand

and

HENRY EAMONN CONNOR
Botany Division, Department of Scientific & Industrial Research, Christchurch, New Zealand

(*Received* 8 *December* 1972. *Accepted* 5 *January* 1973)

Key Word Index—*Cortaderia*; Gramineae; arundinoid; hemicellulose; cellulose.

Plants. Seven species of *Cortaderia* as detailed in Table 1; specimens deposited at CHR. Material separated into leaf blades and sheaths. *Source.* All plants grown in replicated blocks in Botany Division experimental gardens, Lincoln. *Previous work.* Hemicellulose 21–24% and cellulose 37–40% recorded in leaves and leaf bases of pampas grass *Cortaderia argentea*).[1] *Uses.* Pampas grass grown as cattle forage.

TABLE 1. STRUCTURAL CARBOHYDRATE LEVELS IN *Cortaderia* LEAVES (% of oven-dry tissue)

Species	Leaf blade			Leaf sheath		
	Hemi-cellulose	Cellulose	Klason lignin	Hemi-cellulose	Cellulose	Klason lignin
Section Bifida						
Cortaderia richardii (Endl.) Zotov	22·04	34·17	9·37	28·98	31·52	8·48
C. toe toe Zotov	24·39	31·15	9·73	25·70	28·40	8·82
C. splendens Connor	21·25	30·12	10·68	26·14	26·24	7·61
C. fulvida (Buchan.) Zotov	23·62	27·82	10·24	26·97	26·48	10·19
Section Cortaderia						
C. araucana Stapf*	23·07	22·89	10·60	29·26	24·62	10·24
C. jubata (Lem.) Stapf†	20·66	25·93	9·45	26·68	23·51	9·99
C. selloana (Schult.) Asch. et Graeb.‡	21·01	29·90	10·82	26·37	26·22	12·06

* Plant raised from seed collected at Las Lagos, Province of Valdivia, Chile.
† Naturalised in New Zealand, of South American origin.
‡ Naturalized in New Zealand, of South American origin. Report under *C. argentea*[1] applies to *C. selloana*. All other species New Zealand endemics.

[1] SHORLAND, F. B. and BROOKER, S. E. (1935) *N.Z. J. Sci. Technol.* **17**, 528.

Present work. Structural carbohydrates are usually measured in the festucoid, panicoid and eragrostoid grasses of value as pasture. A recent detailed study of these carbohydrates in four species of the New Zealand arundinoid genus. *Chionochloa* (snow tussock) showed high levels of cellulose (26–32%) and hemicellulose (22–26%) in the green leaf blades with leaf sheaths containing higher (28–32%) hemicellulose and lower (20–29%) cellulose levels.[2] As these carbohydrate values appear high, relative to those recorded for festucoid and panicoid grasses,[2–4] and because of the difference between levels in leaf blades and sheaths, we have measured the levels of these two structural carbohydrate fractions in the same two tissues from green leaves of seven species of another arundinoid genus, *Cortaderia.* Results are in Table 1. They show, as in *Chionochloa*, that sheaths are always higher in hemicellulose and lower in cellulose than leaf blades with a correlation between sheath and leaf cellulose of $r = 0{\cdot}871^*$ (for similar *Chionochloa* results[2] $r = 0{\cdot}872^{**}$). The few recorded analyses for structural polysaccharides in both leaf sheaths and blades of festucoid[3] and panicoid[2] grasses are in marked contrast in that in these latter groups both hemicellulose and cellulose are higher in the leaf sheath than in the blade. Taken with the chionochloa[2] results the present work suggests that high cellulose is a feature of arundinoid leaf blades with leaf sheath levels significantly correlated with them and always lower.

EXPERIMENTAL

Mature green leaves were removed from several plants of each species, except for *C. araucana* where only one plant was available, at the beginning of May 1972 and separated into leaf sheaths and the lower 60 cm of leaf blade. Each sample (*ca.* 100 g green wt) was freeze-dried and ground. After removal of solubles, by extraction with boiling neutral detergent, hemicellulose and cellulose were sequentially hydrolysed with acid and liberated reducing sugars measured.[6] Reducing sugars liberated successively with boiling 1 N H_2SO_4 and with boiling 1 N H_2SO_4 after pretreatment with 72% H_2SO_4 are reported as anhydro sugars, as hemicellulose and cellulose respectively. Acid insoluble, organic material was recorded as Klason lignin.

[2] BAILEY, R. W. and CONNOR, H. E. (1972) *N.Z. J. Botany* **10,** 533.
[3] JARRIGE, R. (1963) *Annls. Biol. Anim. Biochim. Biophys.* **3,** 143.
[4] EVANS, P. S. (1967) *J. Agr. Sci. Camb.* **69,** 175.
[5] VAN SOEST, P. J. (1966) *J. Assoc. Offic. Agr. Chem.* **49,** 546.
[6] BAILEY, R. W. (1967) *N.Z. J. Agr. Sci.* **10,** 15.