

## REFERENCES.

- Barry, T. N., 1984. The effects attributable to condensed tannins in New Zealand forages. In: Laboratory
- Abdalla, H. O., Fox, D. G. & Seaney, R., 1988. Protein distribution in four cool-season grass varieties alone or in combination with trefoil. J.Anim.Sci. 66: 2325.
- Adams, D. C. & Kartchner, R. J., 1984. Effect of level of forage intake on rumen  $\text{NH}_3$ , pH, liquid volume and liquid dilution rate in beef cattle. J.Anim.Sci. 58: 708.
- J.Sci.Food.Agric. 34: 1047.
- Aii, T. & Stobbs, T. H., 1980. Solubility of the protein of tropical pasture species and the rate of its degradation in the rumen. Anim.Feed.Sci.Tech. 5: 183.
- animal concentration of volatile fatty acids. J.Agric.Sci. (Camb) 64: 67
- Aitchison, T. E., Mertens, D. R., McGilliard, A. D. & Jacobson, N. L., 1976. Effects of nitrogen solubility on nitrogen utilization in lactating dairy cattle. J.Dairy Sci. 59: 2056.
- radioactive digesta marker systems for the measurement of nutrient flow at the proximal duodenum of
- Allen, M. S., 1990. Feeding the super producing dairy cow. Proc. Annual congress. S.Afr.Soc.Anim.Prod. Stellenbosch.
- Body, D. R. & Hansen, R. P., 1978. The occurrence of  $\text{C}_{13}$  -
- Assoc. Off. Anal. Chem. (1984). Official methods of analysis. 14<sup>th</sup> ed. Virginia:U.S.A.
- acids in both the fescue and ryegrass. J.Sci.Food.Agr. 29: 107.
- Baker, C. J. L., Alderman, M. & Eden, A., 1952. Studies of the composition of sainfoin. J.Agr.Sci. 42: 382.

- Barry, T. N., 1984. The nutritional effects attributable to condensed tannins in New Zealand forages. In: Laboratory evaluation of fibrous feeds - Relationships to nutrient requirements and utilization by ruminants. Symposium Proceedings Banff. September, 1984. Section 5.
- Barry, T. N. & Forss, D. A., 1983. The condensed tannin content of vegetative Lotus pedunculatus, its regulation by fertilizer application and effect upon protein solubility. J.Sci.Food.Agric. 34: 1047.
- Bath, I. H. & Rook, J. A. F., 1965. The evaluation of cattle foods and diets in terms of the ruminal concentration of volatile fatty acids. J.Agric.Sci. (Camb) 64: 67.
- Beever, D. E., Kellaway, R. C., Thomson, D. J., MacRae, J.C., Evans, C. C. & Wallace, A. S., 1978. A comparison of two non-radioactive digesta marker systems for the measurement of nutrient flow at the proximal duodenum of calves. J.Agric.Sci. (Camb) 90: 157.
- Body, D. R. & Hansen, R. P., 1978. The occurrence of C<sub>13</sub> - C<sub>31</sub> branched chain fatty acids in the faeces of sheep fed ryegrass and of C<sub>12</sub> - C<sub>34</sub> normal acids in both the faeces and ryegrass. J.Sci.Food.Adr. 29: 107.

Broderick, G. A. & Craig, M., 1980. Effect of heat treatment on ruminal protein degradation and escape and intestinal digestibility of cotton seed meal. J.Nutr. 110: 2381.

Burns, J. E., Mochrie, R. D. & Cope, W. A., 1972. Responses of dairy heifers to crown vetch, Sericea lespedeza and alfalfa forages. Agron.J. 64: 193.

Burroughs, W., Frank, N. A., Gerlaugh, P. & Bethke, R. M., 1950. Preliminary observations upon factors influencing cellulose digestion by rumen micro-organisms. J.Nutr. 40: 9.  
range plants by sheep. J. Anim.Sci. 10: 565.

Carleton, W. A., Cooper, C. S., Roath, C. W., Krall, J. L. & Cromwell, C. W., 1968. Evaluation of sainfoin for irrigated hay in Montana. In: (Eds.) C. S. Cooper and A. E. Carleton. Sainfoin symposium Montana University. December 1968. p. 44.

Chalmers, M. I. & Synge, R. L. M., 1954. Ruminal ammonia formation in relation to the protein requirement of sheep II. Comparison of casein and herring meal supplements. J.Agr.Sci. 44: 263.

Pickering, P. S., 1979. Ruminal and post-ruminal digestion of pasture herbage by grazing lambs.  
Chamberlain, D. G. & Thomas, P. C., 1979. Prospective laboratory methods for estimating the susceptibility of feed proteins to microbial breakdown in the rumen. Proc.Nutr.Soc. 38: 138.  
by grazing livestock: A review. J.Range.Manage. 31: 430.

Chapman, H. W. & Grovum, W. L., 1984. Oesophageal fistulation of sheep for sham feeding studies (Can. J.Anim.Sci. 64 (suppl): 106.

Connor, J. M., Bohman, V. R., Lesperance, L. A. & Kinsinger, F. E., 1963. Nutritive evaluation of summer range forage with cattle. J.Anim.Sci. 22: 961.

Cook, C. W. & Harris, L. E., 1951. A comparison of the lignin ratio technique and the chromogen method of determining digestibility and forage consumption of desert range plants by sheep. J. Anim.Sci. 10: 565.

Cope, W. A. & Burns, J. C., 1971. Relationship between tannin levels and nutritive value of Sericea. Crop Sci. 11: 231. A. E. Carleton. Sainfoin Symposium. Montana Univ. Dec 1968. p. 102.

Corbett, J. L., 1979. Nitrogen intake, digestion and retention by grazing lambs. Proc.Nutr.Soc. 38: 142.

Corbett, J. L. & Pickering, F. S., 1979. Ruminal and postruminal digestion of pasture herbage by grazing lambs. Proc.Nutr.Soc. 38: 142A.

Corbett, J. L., 1970. Effect of genotype and tannin on dry matter digestibility in Sericea lespedeza.

Cordova, F. J., Wallace, J. D. & Pieper, R. D., 1978. Forage intake by grazing livestock: A review. J.Range.Manage. 31: 430.

Crampton, E. W. & Maynard, L. A., 1938. The relation of cellulose and lignin content to the nutritive value of animal feeds. J.Nutr. 15: 383.

Crooker, B. A., Sniffen, C. J., Hoover, W. H. & Johnson, L. L., 1978. Solvents for soluble nitrogen measurements in feedstuffs. J.Dairy.Sci. 61: 437.

Cruickshank, G. J., Poppi, D. P. & Sykes, A. R., 1985. Intake and duodenal protein flow in early weaned lambs grazing white clover, lucerne, ryegrass, and Prairie grass. N.Z.Soc.Anim.Prod. 45: 113.

Davis, A. M., 1968. Variation in the protein content of a collection of sainfoin from U.S.S.R. In: (Eds.) C. S. Cooper and A. E. Carleton. Sainfoin Symposium. Montana. Univ. Dec 1968. p. 102.

Donnelly, E. D. & Anthony, W. B., 1969. Relationship of tannin, dry matter digestibility and crude protein in Sericea lespedeza. Crop.Sci. 9: 361.

Donnelly, E. D. & Anthony, W. B., 1970. Effect of genotype and tannin on dry matter digestibility in Sericea lespedeza. Crop.Sci. 10: 200.

Dove, H., Mayes, R. W., Freer, M., Coombe, J. B. & Foot, J. Z., 1989. Faecal recoveries of the alkanes of plant cuticular waxes in penned and in grazing sheep. Proc.Int.Grassl.Congr. Nice. France. 1989. p 1091.

Dove, H., Foot, J. Z. & Freer, M., 1989. Estimation of pasture intake in grazing ewes using the alkanes of plant cuticular waxes. Proc.Int.Grassl.Congr. Nice. France. 1989. p 1093. Anim.Sci. 18 (1): 23.

Downes, A. M. & McDonald, I. W., 1964. The chromium - 51 complex of ethylenediaminetetra-acetic acid as a soluble rumen marker. Br.J.Nutr. 18: 153.

Drennan, M. J., Holmes, J. H. G. & Garrett, W. N., 1970. A comparison of markers for estimating magnitude of rumen digestion. Br.J.Nutr. 24: 961.

Egan, A. R., 1965. Nutritional status and intake regulation in sheep. The influence of sustained duodenal infusion of casein or urea upon voluntary intake of low protein roughages by sheep. Aust.J.Agric.Res. 16: 451. New England Publishing unit: Armidale, p 277.

Ely, R. A. & Moore, L. A., 1955. Holocellulose and summative analysis of forages. J.Anim.Sci. 14: 718. digestion by ruminant lambs of a diet containing formaldehyde treated casein. Aust.J.Agric.Res. 22: 461.

- Engels, A. N. & Van der Merwe, F. J., 1967. Application of the in vitro technique to South African forages with special reference to the effects of certain factors on the results. S.Afr.J.Anim.Sci. 10: 983.
- Erasmus, L. J., Prinsloo, J. & Meissner, H. H., 1988. Establishment of a protein degradability data base for dairy cattle using the nylon bag technique. 1. Protein sources. S.Afr.J.Anim.Sci. 18 (1): 23.
- Evans, J. L. & Biddle, G. N., 1971. Utilization of nitrogen by source and solubility of nitrogen. J.Anim.Sci. 33: 317 (Abst.)
- Faichney, G. J., 1972. An assessment of chromic oxide as an indigestible marker for digestion studies in sheep. J.Agric.Sci. (Camb) 79: 493.
- Faichney, G. J., 1975. The use of markers to partition digestion within the gastro-intestinal tract of ruminants. In: (Eds.) I. W. McDonald and A. C. I. Warner. Digestion and metabolism in the ruminant. University of New England Publishing unit: Armidale. p 277.
- Faichney, G. J. & Weston, R. H., 1971. Digestion by ruminant lambs of a diet containing formaldehyde treated casein. Aust.J.Agric.Res. 22: 461.

- Faichney, G. J. & White, G. A., 1977. Formaldehyde treatment of concentrate diets. I. Aust.J.Agric.Res. 28: 1055.
- Nitrogen and chromium as faecal index substances.
- Fair, J., 1989. Guide to profitable Pastures (2nd Ed.). M and J Publishers:Harrismith.
- Griffiths, T. W. & Bath, I. H., 1973. Effects of energy and
- Fisher, A. G., Brick, M. A., Riley, R. H. & Christensen, D. K., 1987. Dryland stand establishment and seed production of vegetation species. Crop.Sci. 27: 1303.
- Flores, J. F., Stobbs, T. H. & Minson, D. J., 1979. The influence of the legume Leucaena leucocephala and formaldehyde treated casein on the production and composition of milk from grazing cows. J.Agric.Sci. (Camb) 92: 351.
- of Laboratory Methods. S. African Department of Agriculture. 1989.
- Freud, R. J. & Littel, R. C., 1981. SAS for linear models. A guide to the ANOVA and GLM Procedures. SAS Institute, North Carolina.
- Int (Eds.) C. S. Cooper and A. S. Carleton. Sainfoin Symposium. Montana University. December, 1988. p.
- Gaylean, M. L., Krysl, L. J. & Estell, R. E., 1986. Marker based approaches for estimation of faecal output and digestibility in ruminants. In: Feed intake by beef cattle. Symposium proceedings. Oklahoma, Nov. 1986. p. 96. 951.
- Ingalls, J. R., Thomas, J. W., Benre, E. J. & Tesar, M., 1965. Comparative response of wether lambs to several cuttings of alfalfa, birdsfoot trefoil, bromegrass and reed canary grass. J.Anim.Sci. 34: 1119.

Greenhalgh, J. F. D. & Corbett, J. L., 1960. The indirect estimation of the digestibility of pasture herbage. 1. Nitrogen and chromogen as faecal index substances. J.Agric.Sci.(Camb) 55: 371.

Griffiths, T. W. & Bath, I. H., 1973. Effects of energy and nitrogen supplementation of silage diets on rumen fermentation in fistulated heifers. J.Agric.Sci. (Camb) 80: 89.

Joyce, J. P., Brunswick, L. & Parker, J., 1973. Feeding Hagerman, A. E., 1987. Radial diffusion method for determining tannin in plant extracts. J.Chem.Ecol. 13 (3): 437.

Miller, R. J. & Rittenhouse, L. R., 1979. A fecal-urine separator for making total faecal collections from the Handbook of Laboratory Methods. S. African Department of Agriculture. 1989.

Kay, R. W. B., 1968. Effects of dietary tannic acid on the Hanna, M. R. & Smoliak, S., 1968. Sainfoin yield evaluations in Canada. In: (Eds.) C. S. Cooper and A. E. Carleton. Sainfoin Symposium. Montana University. December, 1968. p. 38. Canad. J. Crop.Sci. 6: 487.

Hogan, J. P. & Weston, R. H., 1971. The utilization of alkali-treated straw by sheep. Aust.J.Agric.Res. 22: 951.

Ingalls, J. R., Thomas, J. W., Benre, E. J. & Tesar, M., 1965. Comparative response of wether lambs to several cuttings of alfalfa, birdsfoot trefoil, bromegrass and reed canary grass. J.Anim.Sci. 24: 1159.

- Jensen, E. H. & Sharp, M. E., 1968. Agronomic evaluation of sainfoin in Nevada. In: (Eds.) C. S. Cooper and A. E. Carleton. Sainfoin Symposium. Montana University. December, 1968. p 34.
- Joyce, J. P., 1969. The feed intake of sheep supplemented with varying quantities of wheat while grazing.
- Jones, L. H. P. & Handreck, K. A., 1965. The relation between the silica content of the diet and the excretion of silica by sheep. J.Dairy.Sci. 65: 129.
- Langlands, J. P., 1975. Techniques for estimating nutrient requirements of the ruminant. University of New England.
- Joyce, J. P., Brunswick, L. & Parker, J., 1973. Feeding value of lucerne. Proc.N.Z.Soc.Anim.Prod. 32: 54.
- Kartchner, R. J. & Rittenhouse, L. R., 1979. A faeces-urine separator for making total faecal collections from the female bovine. J.Range Manage. 32: 404.
- Kay, R. N. B., 1968. Effects of dietary tannic acid on the solubility of polyethylene glycol. Proc.Nutr.Soc. 28: 22A.
- Kendall, W. A., 1966. Factors affecting foams with forage legumes. Crop.Sci. 6: 487.
- Kotb, A. R. & Luckey, T. D., 1972. Markers in nutrition. Nutr.Abstr.Rev. 42: 813.
- Krishnamoorthy, V., Muscato, T. V., Sniffen, C. J. & Van Soest, P. J., 1982. Nitrogen fractions in selected feedstuffs. J.Dairy Sci. 65: 217 - 225.

Kumar, R. & Singh, M., 1984. Tannins: Their adverse role in ruminant nutrition. J.Agric.Food.Chem. 447.

Langlands, J. P., 1969. The feed intake of sheep supplemented with varying quantities of wheat while grazing pastures with different levels of available herbage. Aust.J.Agric.Res. 20: 919.

Langlands, J. P., 1975. Techniques for estimating nutrient intake and its utilization by the grazing ruminant. In: (Eds.) I.W. McDonald and A. C. I. Warner. Digestion and metabolism in the ruminant. University of New England Publishing Unit: Armidale. p 330.

Lindsay, D. B. & Armstrong, D. G., 1982. Postruminal digestion and the utilization of nitrogen. In: Forage Protein in Ruminant Animal Production (eds. D. J. Thomson, D. E. Beever and R. G. Gunn) Occ.Publ.Br.Soc.Anim.Prod. No:6. p 13.

Ling, J. R. & BATTERY, P. J., 1978. The simultaneous use of ribonucleic acid, <sup>35</sup>S, 2,6-diaminopimelic acid and 2-aminoethylphosphoric acid as markers of microbial nitrogen entering the duodenum of sheep. Br.J.Nutr. 39: 165.

Lippke, H., Ellis, W. C. & Jacobs, B. F., 1986. Recovery of indigestible fibre from faeces of sheep and cattle on forage diets. J.Dairy Sci. 69: 403.

Little, C. O., Burroughs, W. & Woods, W., 1963. Nutritional significance of soluble nitrogen in dietary proteins for ruminants. J.Anim.Sci. 22: 358.

Mahadevan, S., Erfle, J. D. & Sauer, F. D., 1979. A colorimetric method for the determination of proteolytic degradation of feed proteins by rumen microorganisms. J.Anim.Sci. 48: 947.

Mayes, R. W. & Lamb, C. S., 1984. The possible use of n-alkanes in herbage as indigestible markers. Proc.Nutr.Soc. 43: 39A.

Mayes, R. W., Lamb, C. S. & Colgrove, P. M., 1986. The use of dosed and herbage n-alkane as markers for the determination of herbage intake. J.Agric.Sci. (Camb.) 107: 161.

McDowell, R. L., Conrad, J. H. & Ellis, G. L., 1983. In: (Eds.) F. M. C. Gilchrist and R. I. Mackie. Herbivore nutrition in the subtropics and tropics. Proc. Int. Symposium on Herbivore Nutrition in the subtropics. April, 1983, C.S.I.R. Pretoria. p. 67.

McDowell, R. L., Conrad, J. H. & Ellis, G. L., 1983. In: (Eds.) F. M. C. Gilchrist and R. I. Mackie. Herbivore nutrition in the subtropics and tropics. Proc. Int. Symposium on Herbivore Nutrition in the subtropics. April, 1983, C.S.I.R. Pretoria. p. 67.

McLeod, M. N., 1974. Plant tannins - their role in forage quality. Nutr.Abstr.Rev. 44: 803.

McLeod, M. N., 1974. Plant tannins - their role in forage quality. Nutr.Abstr.Rev. 44: 803.

Animal based methods of determining herbage intake and quality under grazing conditions. Proc.Grassl.Soc.South Africa 11: 71.

McManus, W. R., Dudzinski, M. L. & Arnold, G. W., 1967. Estimation of herbage intake from nitrogen, copper, magnesium and silicon concentration in faeces. J.Agric.Sci. 69: 263.

Mocan, J. E., 1985. Evaluation of specific variables

McMeninam, N. P., Ben-Ghedalia, D. & Elliot, R., 1976. Sulphur and cystine incorporation into rumen microbial protein. Br.J.Nutr. 36: 571.

Nordkvist, E., Graham, H. & Aman, P., 1987. Degradation in

MacRae, J. C., 1975. The use of re-entrant cannulae to partition digestive function within the gastrointestinal tract of ruminants. In: (Eds.) I. W. McDonald and A. C. I. Warner. Digestion and metabolism in the ruminant. University of New England Publishing Unit: NSW. p 261.

Meissner, H. H., Van Niekerk, W. A., Spreeth, E. B. & Koster, H. H., 1989. Voluntary intake of several planted pastures by sheep and an assessment of NDF and IVDOM as possible predictors of intake. J.Grassl.Soc.South.Africa 6: 156. and lignin fractions. Proc.Nutr.Soc. 30: 13A.

Minson, D. G. & Milford, R., 1967. In vitro and faecal nitrogen techniques for predicting the voluntary intake of Chloris gayana. J.Grassl.Soc. 22: 170.

Prakov, E. E. & McDonald, I., 1979. The utilization of

Morgan, P. J. K., Pienaar, J. P. & Clark, R. A., 1976. Animal based methods of determining herbage intake and quality under grazing conditions. Proc.Grassl.Soc.South.Africa 11: 73.

Murphy, J. J. & Kennely, J. J., 1987. Effect of concentration and protein source on the degradability of dry matter and protein in situ. J.Dairy.Sci. 70: 1841.

Nocek, J. E., 1985. Evaluation of specific variables affecting in situ estimates of ruminal dry matter and protein digestion. J.Anim.Sci. 60: 1347.

Nordkvist, E., Graham, H. & Aman, P., 1987. Degradation in vitro and in sacco of red clover leaves and stems. Anim.Feed.Sci.Tech. 17: 295.

Norman, A. G., 1935. The composition of crude fibre. J.Agric.Sci. (Camb) 25: 529.

Osbourn, D. F., Terry, R. A., Cammell, S. B. & Outen, G. E., 1971. The effect of leuco-anthocyanins in sainfoin (Onobrychis viciifolia scop.) on the availability of protein to sheep and upon the determination of the acid detergent fibre and lignin fractions. Proc.Nutr.Soc. 30: 13A.

Ørskov, E. R., 1982. In: Protein nutrition in ruminants. Academic Press: London.

Ørskov, E. R. & McDonald, I., 1979. The estimation of protein degradability in the rumen from incubation measurements weighted according to rate of passage. J.Agr.Sci. (Camb) 92: 499.

Ørskov, E. R. & Mehrez, A. Z., 1977. A study of the artificial bag technique for determining the digestibility of feeds in the rumen. J.Agric.Sci. (Camb) 88: 645.

Paulsmeier, D. V., 1987. The influence of abomasal supplements of protein and energy on the utilization of winter and spring Kikuyu (Pennisetum clandestinum) and Smuts finger (Digitaria eriantha ssp. eriantha) by sheep. M.Sc. (Agric) Thesis. University of Pretoria.

Raymond, W. P., 1964. Studies in the digestibility of

Penning, P. D. & Johnson, R. H., 1983a. The use of internal markers to estimate herbage digestibility and intake. Potentially indigestible cellulose and acid insoluble ash. J.Agric.Sci. (Camb) 100: 127.

Raymond, W. P., 1969. Nutritive value of forage crops.

Penning, P. D. & Johnson, R. H., 1983b. The use of internal markers to estimate herbage digestibility and intake. 2. Indigestible acid detergent fibre. J.Agric.Sci. (Camb) 100: 127.

Loosli, J. K., Turk, E. L., Miller, J. I. & Blaser, R. E., 1959. A new indicator method for the determination of

Peter, A. P., Hatfield, E. E., Owens, F. N. & Garrigus, V. S., 1973. Effects of aldehyde treatments of soybean meal on in vitro ammonia release, solubility and lamb performance. J.Nutr. 101: 605.

Folk, P. G., Hardison, W. A., Martin, G. M., Bunclage, A. L. & Kaufman, R. W., 1952. A procedure for

Pilgrim, A. F., Gray, F. V., Weller, R. A., & Belling, C. J., 1970. Synthesis of microbial protein from ammonia in the sheep's rumen and the proportion of dietary nitrogen converted into microbial nitrogen. Br.J.Nutr. 24: 589.

Poos, M. T., Klopfenstein, T., Britton, R. A. & Olson, D. G., 1980. An enzymatic technique for determining ruminal protein degradation. J.DairySci. 63 (Suppl. 1): 142.

Raab, L., Cafantaris, B., Tilg, T. & Menke, K. H., 1983. Rumen protein degradation and biosynthesis. 1. A new method for determination of protein degradation in rumen fluid in vitro. Br.J.Nutr. 50: 569.

Raymond, W. F., 1954. Studies in the digestibility of herbage. III The use of faecal collection and chemical analysis in pasture studies. a. Ratio and tracer method. J.Br.Grassl.Soc. 9: 61.

Raymond, W. F., 1969. Nutritive value of forage crops. Advan.Agron. 21: 1.

Reid, J. T., Woolfolk, P. G., Richards, C. R. Kaufman, R. W., Loosli, J. K., Turk, K. L., Miller, J. I. & Blaser, R. E., 1950. A new indicator method for the determination of digestibility and consumption of forages by ruminants. J.Dairy Sci. 33: 60.

Reid, J. T., Woolfolk, P. G., Hardison, W. A., Martin, G. M., Bunclage, A. L. & Kaufman, R. W., 1952. A procedure for measuring the digestibility of pasture forage under grazing conditions. J.Nutr. 46: 255.

Rethman, N. F. G., Odendaal, J. J. and De Witt, C. C., 1986. Performance of Medicago sativa under dryland conditions of the eastern highveld. J.Grassl.Soc.South.Africa. Vol 3(4): 122. lucerne (Medicago sativa L). Annals of Botany, 48: 111.

Reynolds, P. J., Jackson, C., Lindahl, I. L. & Henson, P. R., 1967. Consumption and digestibility of crown vetch (Coronilla varia L) forage by sheep. Agron.J. 59: 589. J.Anim.Sci. 24: 901.

Roath, C. W. & Graham, D. R., 1968. Response of sainfoin to phosphorous. In: (Eds.) C. S. Cooper and A. E. Carleton. Sainfoin Symposium. Montana University. December, 1968. p. 63. v marker. Brit.J.Nutr. 54: 909.

Satter, L. P. & Roffler, R. E., 1977. Influence of nitrogen and carbohydrate inputs on rumen fermentation. Ch. 3. In: (eds.) W. Haresign and D. Lewis. Recent advances in Animal Nutrition. Butterworths:London. p. 25. J.Anim.Sci. 45: 1008.

Sharma, H. R., Ingalls, J. R. & McKirdy, 1972. Nutritive value of formaldehyde treated rapeseed meal for dairy calves. Can.J.Anim.Sci. 52: 363. J.Anim.Sci. 45: 1008.

Shedrick, R. D. & Thomson, D. J., 1982. Management and utilization of sainfoin (Onobrychis sativa). Information leaflet. No. 13. Grassland Research Institute, Hurley:Berkshire. 1969. A review of techniques used to estimate the *in vivo* digestibility of grazed forage. J.Anim.Sci. 29: 157.

Sheehy, J. E. & Popple, S. C., 1981. Photosynthesis, water relations, temperature and canopy structure as factors affecting growth of sainfoin (Onobrychis viciifolia scop) and lucerne (Medicago sativa L). Annals of Botany. 48: 113.

Sherrod, L. B. & Tillman, A. D., 1962. Effects of varying the processing temperature upon the nutritive values of sheep of solvent extracted soybean and cottonseed meals. J.Anim.Sci. 21: 901.

Siddons, R. C., Paradine, J., Beever, D. E. & Cornell, P. R., 1985. Ytterbium acetate as a particulate-phase digesta flow marker. Brit.J.Nutr. 54: 509.

Snedecor, G. W., 1956. Statistical methods 5th Ed. Iowa State University Press.

Stewart, W. E., Stewart, D. G. & Schultz, L. H., 1958. Rates of volatile fatty acid production in the bovine rumen. J.Anim.Sci. 17: 723.

Stobbs, T. H., Minson, D. J. & McLeod, M. N., 1977. The response of dairy cows grazing a nitrogen fertilized grass pasture to a supplement of protected casein. J.Agric.Sci. (Camb). 89: 137.

Streeter, C. L., 1969. A review of techniques used to estimate the in vivo digestibility of grazed forage. J.Anim.Sci. 29: 757.

- Terill, T. H., Windham, W. R., Evans, J. J. & Hoveland, C. S., 1990. Condensed tannin concentration in Sericea lespedeza as influenced by preservation method. Crop.Sci. 30: 219.
- Van Soest, P. J., 1983. Use of detergents in the analysis of
- Terry, R. A. & Tilley, J. M. A., 1964. The digestibility of the leaves and stems of perennial ryegrass, cocksfoot, Timothy, Tall fescue, lucerne and sainfoin as measured by an in vitro procedure. J.Br.Grassl.Soc. 19: 363. Influencing the voluntary intake of herbage by ruminants. Voluntary intake
- Thomson, D. J., 1976. Legumes for today and tomorrow. Science in Grassland. 1976 p. 25.
- Tilley, J. M. A. & Terry, R. A., 1963. A two stage technique for the in vitro digestion of forage crops. J.Br.Grassl.Soc. 18: 104.
- Van Soest, P. J., 1984. Chemical procedures for evaluating
- Topps, J. H., 1962. Studies of natural herbage of the subtropics. 1. The digestibility of herbage grazed by cattle. J.Agric.Sci. (Camb) 58: 387.
- Uden, P., Colucci, P. E. & Van Soest, P. J., 1980. Investigation of chromium, cerium and cobalt as markers in digesta. Rate of passage studies. J.Sci.Food.Agr. 31: 625.
- Van Dyne, G. M. & Meyer, J. H., 1964. A method for the measurement of forage intake of grazing livestock using microdigestion techniques. J.Range.Manage. 17: 204.

Van Nevel, C. J. & Demeyer, D. I., 1977. Determination of rumen microbial growth in vitro from  $^{32}\text{P}$ -labelled phosphate incorporation. Br.J.Nutr. 38: 101.

Van Soest, P. J., 1963. Use of detergents in the analysis of fibrous feeds. II. A rapid method for the determination of fiber and lignin. J.Assoc.Off.Anal.Chem. 46: 829.

Van Soest, P. J., 1965. Symposium on factors influencing the voluntary intake of herbage by ruminants. Voluntary intake in relation to chemical composition and digestibility. J.Anim.Sci. 24: 834.

Van Soest, P. J., 1982. In: Nutritional ecology of the ruminant. O. and B. books: Oregon.

Van Soest, P. J., 1984. Chemical procedures for evaluating nutritive value. Section 3. In: (Ed.) J. E. Knipfel. Laboratory evaluation of fibrous feeds. Swift current Research Station: Saskatchewan.

Van Soest, P. J. & Wine, R. H., 1967. Use of detergents in the analysis of fibrous feeds. IV. Determination of plant cell wall constituents. J.Assoc.Off.Anal.Chem. 50: 50.

Varga, P., 1968. Aims in sainfoin breeding in Romania. In: (Eds.) C. S. Cooper and A. E. Carleton. Sainfoin Symposium. Montana University. December, 1968. p. 87

Wallace, J. D. & Van Dyne, G. M., 1970. Precision of indirect methods for estimating digestibility of forage consumed by grazing cattle. J.Range.Manage. 23: 424.

Walker, D. J. & Nader, C. J., 1975. Measurement in vivo of rumen microbial synthesis. Aust.J.Agric.Res. 26: 689.

Measurement of protein solubility in common feedstuffs.

Weston, R. H. & Hogan, J. P., 1967. The digestion of chopped and ground roughages by sheep. The movement of digesta through the stomach. Aust.J.Agric.Res. 18: 789.

Whitelaw, F. G. & Preston, T. R., 1963. The nutrition of the early-weaned calf. Protein solubility and amino acid composition as factors affecting protein utilization. Anim.Prod. 5: 131.

Wilkins, R. J., 1969. The potential digestibility of cellulose in forage and faeces. J.Agric.Sci. (Camb). 73: 57.

Wilman, D & Asiedu, F. H. K., 1983. Growth, nutritive value and selection by sheep of sainfoin, red clover, lucerne and hybrid ryegrass. J.Agric.Sci. (Camb). 100: 115.

Wilman, D., Koocheki, A., Lwoga, A.B. & Samaan, S. F., 1977. Digestion in vitro of Italian and perennial ryegrasses, red clover, white clover and lucerne. J.Br.Grassl.Soc. 32: 13.

Wise, M. B., Ordoveza, A. L. & Barnick, E. R., 1963.  
Influence of variation in dietary calcium: phosphorus ratio  
on performance and blood constituents of calves. J.Nutr. 79:  
79.

Wohlt, J. E., Sniffen, C. J. & Hoover, W. H., 1973.  
Measurement of protein solubility in common feedstuffs.  
J.Dairy Sci. 56: 1052.