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Presenter Information

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The Effect of Different Interval between Pasture Belts on Water and Soil Conservation

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Key words : interval, water and soil conservation, soil fertility

Introduction The study was conducted on the impact of different intervals between pasture belts on water and soil conservation as well as on physical and chemical characteristic of soil on the sloping arable land with the elevation of 15°. Results indicated that water and soil erosion could be effectively controlled by planting pasture in belts on the sloping land. The shorter the intervals between pasture belts were, the better results it would be in terms of erosion control. However, if considered the balance of soil erosion control and cropping for proper land utilization, it was suggested that 13 meters of the interval between pasture belts would be recommended.

Materials and methods The trail was conducted on the sloping arable land with the elevation of 15° in Xuanwei city with method of randomized factorial design of each interval treatment with three replications and three different treatments in total as A, B, C. 2.5m×17m, 2.5m×13m and C, 2.5m×9m in plot size. Each plot was furrowed 15cm in depth and sprayed with chemicals to keep the surface bare all the time with the edge of each plot covered with plastic and brick. At the lower end of the plot, pasture belt of 0.5m in width was established with Trifolium repens and Setaria sphacelata cv. Narok at ratio of 1:1 and 15kg/hm² sowing rate in total. A soil runoff collecting ditch was made at the bottom of each plot to measure the unit soil runoff and soil erosion after rain. The soil hardness, unit weight, organic matter and the content of N, P and K were measured in two years of time on different layer of the soil in each plot from 0 to 5cm, 5 to 10cm, 10 to 15cm and 15 to 20cm. The result of the experiment was achieved from the analysis of changing pattern of physical property of the soil and the soil runoff.

Results On the sloping land with elevation of 15°, the soil hardness and unit weight on the bare surface of treatment A, B and C decreased yearly with soil hardness of B and C reached 56.60%, 22.06% and unit weight of B and C, 56.08%, 38.04% that of A respectively. Soil fertility of all treatments degraded annually, worse on the top part. The degradation of organic matter content, total and available P, N and K of B and C was in the sequence as A(17m) > B(13m) > C(9m), which was the same as that of soil runoff, soil physical property. There was a significant difference between treatment A and B, but not quite significant between B and C. It was suggested from the experiment that considering the ideal combination of soil and water conservation and grain cropping, the treatment B of 13m interval between pasture belts would be the best choice.

Table 1 Main items analyzed in the experiment.

items	Year 2003			Year 2004		
	A	B	C	A	B	C
soil hardness (KN)	0.0997	0.1126	0.1131	0.1133	0.1213	0.1165
soil unit weight (g/cm ³)	0.9562	0.9710	0.9616	1.0246	1.0099	0.9878
organic matter (g/kg)	41.52	38.79	40.14	37.30	35.50	37.45
total N (g/kg)	1.63	1.55	1.56	1.09	1.07	1.08
total P (g/kg)	7.84	6.98	7.62	5.22	4.64	5.15
available P (mg/kg)	7.44	7.24	7.23	4.96	5.06	5.24
total K (g/kg)	5.44	4.84	4.71	5.06	4.47	4.38
available K (mg/kg)	93.36	88.82	95.06	77.27	74.74	83.11
surface runoff(m ³ /hm ²)	171.07	130.38	100.32	146.85bB	128.38aA	126.71aA
soil erosion (kg/hm ²)	1280.7cB	790.2bA	694.6aA	1008.2cB	741.2bA	626.6aA

Conclusions Mountainous area takes up 94% of total land in Yunnan, where soil erosion occurred easily. It significantly protects fertility and soil from lossing by establishing pasture belts while cropping on the intervals, which benefits both livestock grain cropping and is a kind of good means for soil and water conservency and sustainable production under the practical rural situation in China.

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