Pasture Work in the Grasslands of the Northern District—Part II

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In Part I of this article, the author outlined the early pasture trial work at P.A.T.I. in which it was found that the species which performed best were Paspalum plicatulum, *Kazungula Setaria, Stylo and Greenleaf Desmodium. Further trials were then established using these species and some others. Since the object of this work was to find pastures most suitable for village cattle projects, attention was concentrated on increasing carrying capacity with the minimum use of agricultural machinery.*

1. *Establishment of Stylo into Kunai Complex*

Project cattle, ranging on natural grassland, keep in good condition if the stocking rate is one beast to eight acres. But because of the relatively small acreages available, a higher stocking rate than this is needed. It was decided to try to raise the carrying capacity of the natural grassland by introducing a vigorous legume at the lowest possible cost.

The natural grassland in this area is a complex mixture of kunai (*Imperata cylindrica*), cane grass (*Pennisetum macrostachyum*) and wild pit pit (*Saccharum edule*). This type of grassland is known as "Kunai Complex".

An area of typical grassland (20 acres) was selected at P.A.T.I. It was rolled and burnt. Rolling prior to burning produced an excellent burn. Deep cultivation was not contemplated as previous cultivation on this type of ground produced a serious weed problem.

Twenty pounds of Stylo were broadcast into the burn. A set of disc harrows, without set or weights, was pulled lightly over the paddock to cover the seed. This was proved unnecessary in later trials, especially when good follow-up rains occurred.

Germination and establishment of Stylo were excellent (see *Plate* V). The original burn changed the complex of the natural species. The better species, *Imperata cylindrica* (kunai), tended to thicken up and compete more favourably with less desirable species such as cane grass and wild pit pit.

The first grazing took place 8 weeks after sowing. Forty cows were grazed for seven days. The pasture was eaten down to about 4 in. Stylo is considered to be unpalatable to cattle but there was no evidence of that in this trial. It was grazed well and was certainly not left.

After the seven days' grazing the paddock had a 28-day rest period. Recovery was excellent.

During the wet season the kunai complex grew faster than the cattle could graze it. The Stylo also grew well and competed well with the kunai complex. In order to control the cane grass, the paddock was rolled. This helped the Stylo and the *Imperata cylindrica* to grow better than the other species which are not such good food for cattle. The paddock is now rolled three times a year. During the dry season, the Stylo seeds vigorously.

With cattle project management it is suggested that this type of pasture would carry a beast to six acres quite safely in this area.

2. Paspalum plicatulum *and Stylo*

Simultaneously with the work just described, it was decided to attempt to establish an improved pasture mixture on an area completely dominated by *Digitaria longiflora*. This was originally a 10-acre kunai paddock, but continual slashing had allowed the creeping Digitaria to take over, resulting in a completely useless paddock.

The Digitaria was burnt in the dry season and ripped with a time implement. Roots and runners brought to the surface required a second burn.

A mixture of Stylo (2 lb/acre) and *Paspalum plicatulum* (2 lb/acre) was broadcast into the second burn. The paddock was then rolled.

Fortunately good rain followed. Stylo germination was excellent, while *P. plicatulum* germination was disappointing. This was possibly due to the age of the seed, as it had been held up for 3 months in transit. Grazing started 8 weeks after sowing. Again, 40 cows

Plate V.—A 3-year-old stand of Stylo and Kunai. The Stylo is seeding

were grazed for seven days, followed by a 28-day rest period. *P. plicatulum* proved very palatable and stood up well to the grazing.

Towards the end of the first rest period, the *P. plicatulum* showed signs of seeding. The paddock was then locked up (that is, not used for grazing) and allowed to seed. Seeding was heavy and uniform. The actual seed fall lasted 2 weeks. The paddock was then subjected to rotational grazing again.

The natural seed fall gave spectacular results. Six months after planting the paddock consisted of a pure stand of Paspalum and Stylo (*Plate* VI).

In the wet season this paddock requires a heavy stocking density to prevent it becoming too rank.

This mixture is easily established and stands very heavy grazing. Both Stylo and *P. plicatulum* will seed if allowed (Stylo in the dry season, and *P. plicatulum* in the wet). It is definitely recommended for this area.

3. *Improving Kunai Complex/Stylo Pasture*

The next trials studied the possibility of introducing improved grasses into a kunai complex/Stylo pasture, after the Stylo was well established. The two grasses previously tested were used again—*Paspalum plicatulum* and Kazungula Setaria (*Setaria anceps* cv Kazungula). In addition Nunbank Buffel (*Cenchrus ciliaris* cv Nunbank) was used as it showed promising qualities, especially in the dry season.

Fifteen acres of kunai complex/Stylo pasture were grazed heavily, nearly to ground level. The area was then disc-harrowed once to a depth of no more than 2 in.

The seed used was:—
P. plicatulum 5 lb
Kazungula Setaria 3 lb
Nunbank Buffel 15 lb

The 23 lb mixture was mixed with sand and broadcast over the fifteen acres. Due to the lightness of the Buffel seed, it was necessary to harrow the paddock again after sowing.

Plate VI.—A 3-year-old stand of *Paspalum plicatulum* and Stylo

Germination was good, and the grasses were allowed to seed.

P. plicatulum and Setaria spread well, and the paddock stood the same stocking rate as used in the previous trials.

Both Stylo and Buffel established well. The Buffel proved to be valuable in the dry season, recovering more quickly than the other introduced grass species. It does not, however, produce the bulk, nor does it have the carrying capacity of the other two grasses. It has the further drawback that its natural seed fall is not viable. Seed must be collected and dry-stored to improve its viability. For these reasons Buffel would not be suitable as the main grass for native cattle projects in this area.

In cases where a project had a legume/kunai stand, it would be economical to harrow and introduce improved grasses by seed, especially free-seeding species such as *P. plicatulum* or Setaria.

4. *Greenleaf Desmodium and Kunai Complex*

Fifteen acres of kunai complex were rolled and burnt. Fifteen pounds of Greenleaf Desmodium (*Desmodium intortum*) seed was

inoculated and broadcast into the burn. This was done at night, as direct sunlight kills the inoculum. A piece of airstrip matting was pulled over the area immediately to cover the inoculated seed. Good rain followed.

Germination and establishment were excellent and the legume stood up to grazing exceptionally well. Although Greenleaf can survive a normal dry season quite well, it suffered severe leaf-fall and stopped growing during the exceptional dry season of 1972. After only 40 points of rain, however, it recovered well (see *Plate* VII). There had been no other rain for 2 months when this photo was taken.

It is intended to introduce Setaria into this pasture as soon as seed is available. The method will involve heavy grazing and broadcasting straight onto the grazed sward.

5. *Dolichos axillaris and Kunai Complex*

Eight acres of kunai complex were rolled, burnt and broadcast with *Dolichos axillaris*. Germination was good, but establishment was very slow, compared to Stylo and Greenleaf Desmodium. This species seems to be less palatable than the other two, but unlike Greenleaf Desmodium, it thrived through the 1972 drought. So far it has not seeded. Observations are continuing.

Plate VII.—Greenleaf Desmodium and kunai complex. This has been under rotational grazing for 10 months

6. *Brachiaria decumbens*

This grass has shown good promise in small grazing trials but has not been tried under paddock conditions, using this crude method of establishment. It is intended to plant six acres using runners from previous trials as planting material. Due to its high protein content and ability to thicken up vegetatively, it could be used on the better projects, especially those established on secondary regrowth bush areas.

Conclusion

It is possible to establish improved pastures into the local kunai merely by burning the kunai and broadcasting the new seed. It is better, however, to put a roller over the paddock first (if a tractor is available) as this will give a better burn. To ensure good germination the seed should be covered after sowing. This can be done in several ways; one way is to drag a piece of airstrip matting over the ground after broadcasting the seed.

Deep cultivation is to be avoided on virgin ground as it produces a serious weed problem. Alternate paddocks could be locked up for short periods annually to allow seed fall. This will give a good ground cover.

The species currently recommended for this type of establishment programme are Stylo/*Paspalum plicatulum* or Stylo/Setaria. For wet areas Greenleaf Desmodium and Para Grass (*Brachiaria mutica*) are suitable. Para Grass was not included in these trials as it has previously proved suitable for wetter conditions.

At the present time the above pasture species on P.A.T.I. are carrying one beast per two acres per year. It is unlikely that this would be possible under the average project management. Although no specific trials have been carried out, generally speaking it would be expected that a kunai/legume (Stylo) mixture would safely carry one beast to six acres. Stocking rate trials carried out by the Animal Industry Branch at the Beef Cattle Research Centre, Erap, have shown that rates of one beast to three acres are possible under reasonable management conditions. A kunai/*Paspalum plicatulum*/Stylo mixture would carry one beast to four acres safely.

Projects in the Northern District are currently following these recommendations for pasture improvement. Instead of using a roller, a heavy chain-mesh was substituted which not only flattens the kunai for burning but also has a light cultivation effect as well. Stylo and Setaria are being used as the initial combination, as seed for these species is most readily available.

Trials are continuing and results will be reported in future issues of *Harvest*.

Quarantine Booklet

D.A.S.F. has recently issued a booklet entitled *Animal and Plant Quarantine in Papua New Guinea—A Guide for Importers*. It gives a brief outline of quarantine regulations concerning specific plants and animals, including timber, straw packing and animal products such as lard and bristles.

The booklet indicates which items may be imported without restriction, which require a permit and which are totally prohibited. Conditions surrounding the issue of permits are given.

Copies of the booklet may be obtained from D.A.S.F. offices at each district headquarters, from all D.A.S.F. Quarantine Officers, and from the Collector of Customs in each port throughout Papua New Guinea. In Port Moresby copies are also available at Jackson's Airport (D.A.S.F. Quarantine Officer) and at D.A.S.F. Headquarters, Konedobu from the reception desk.