Tropical pasture establishment. 10. Satisfying industry's pasture seed requirements

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Abstract

The market for tropical pasture seeds, though enlarged by export sales, is too small and diverse to sustain an entirely stable seed industry. Gross fluctuations in supply, demand, and hence price characterise the industry. Demand changes with the fortunes of the grazing industry and is sensitive to its mood. Supply depends on growers' market predictions and on seasonal weather. Popular lines are normally readily supplied but lack of incentives discourages production of lines with small market prospects. Average prices, adjusted for inflation, are about 40% of their 1970 values, the change reflecting increased production efficiency. Carry-over buffers fluctuation, and supply and price are most stable in lines deliberately and consistently carried over. Seed quality is still variable but improves with growing professionalism by suppliers and discrimination by users. Statutory minimum quality standards seem likely to be replaced by voluntary standards. Genetic quality control through certification has only limited support or applicability. Recent introduction of Plant Variety Rights and exclusive licenses has attracted much controversy. It is too early to assess their impact. The first cultivars to be licensed have so far had small sales; extra costs due to PVR have reduced their competitiveness; and returns to the developer have been minuscule.

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Introduction

The grazing industry's needs for tropical pasture seeds are diverse, highly variable from one year to the next, and by many standards small. It wants those seeds to be cheap and always available. Increasingly it is coming to expect them to be of high quality.

The seed industry serving the grazing industry is also therefore rather small, though somewhat enlarged by export markets. Its small size is aggravated by its diversity of products to the point where, in some respects, it is below the critical size necessary to provide a secure, stable service. Some cultivars, even important ones, have only one serious producer. There are no reliable statistics, but the total value of production in terms of off-farm sales may approach $A10 million annually. It comprises more than 40 different types of seed important enough to appear on the merchants' lists at any one time, and perhaps nearer to 70 types for which some demand exists. Markets for individual lines vary from a few hundred kilos annually of species of restricted use to more than 600 tonnes of the lablabs. A sustained market for >100 tonnes annually of any line is a big and important one.

Does the seed industry adequately satisfy the grazing industry's needs? What difficulties and barriers does it encounter in the attempt? What changes has it to cope with, and what impact will they have? A better and more productive understanding between the two industries will exist if these questions can be openly discussed and honestly answered. Our aim here is to open the debate.

Satisfying industry's needs

Supply

The seed industry has the capacity to produce most lines of seed far beyond present production

levels. Production falls short of supply only when growth in demand takes it by surprise, or as an over-reaction to glut and low price, or because of an unusual climatic disaster.

Price

Prices of many lines have remained relatively stable for a long time. In real terms they have not kept pace with inflation, and are overall about 40% of what they were in 1970 (Figure 1). This is a consequence of adequate production capacity, plus a range of good cultivars, some of which compete with one another and tend to hold prices down.

Quality

Unfortunately a wide range of seed quality is offered to the customer, from substandard to extremely high. Low quality seed will continue to be marketed until the customer becomes more discriminating. There are continuing signs of movement in this direction, but there is still a long way to go.

Service

The area of promotional service to the domestic market has had serious deficiencies from the industry standpoint. Marketing has been essentially passive, the seller waiting for the buyer to come and ask. This is probably because the size of any one market has not justified the expense of promotion. Most promotion has in fact been carried out by DPI extension officers. PVR licensing may result in more active promotion by licensees.

Difficulties and barriers

Fluctuations in supply and demand

Big fluctuations in supply and demand have been a characteristic of the tropical pasture seed

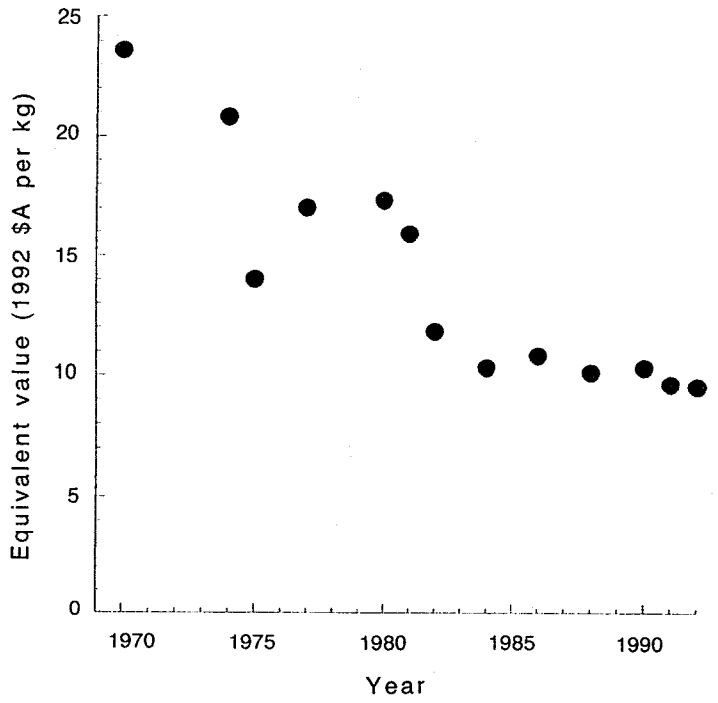

Figure 1. The change in average retail price/kg, expressed in 1992 $A (i.e. actual dollar values adjusted for inflation), of six representative lines of tropical pasture seed (green panic, Kazungula setaria, signal grass, Siratro, Tinaroo glycine and the collective tropical stylos). Data were obtained from incomplete collections of merchants' price lists and, being subject to inconsistencies, are indicative only.

industry since the earliest days. These are generally considered undesirable as they cause substantial price fluctuations, dissatisfy both user and producer, and probably depress long-term consumption. While some of their lesser causes can be removed, they are largely inevitable.

With established lines of popular cultivars, the greatest cause of fluctuation is change in demand, which is governed by a combination of economic and seasonal forces. To produce, once demand is known, presents few problems. Oversupply arises primarily out of fall in demand, but also because of good seasons in producing districts or overoptimism about markets. Casual growers are much more prone than specialists to overoptimism, and very often it is an increase in the number of growers rather than expansion by individual growers that leads to overproduction.

Formerly, major fluctuations were generated with the events that followed release, which then tended to be self-perpetuating. When good cultivars were scarce, a "gold-rush" atmosphere accompanied each new release. Seed was inevitably in short supply initially. This, coupled with the knowledge that it would first be sold for further seed production rather than pasture establishment, led to high prices. In turn, this caused buyer resistance and oversupply. Such initial distortions are now rare. Seed increase committees went to great lengths to eliminate early shortages with the release of open cultivars, and this damped fluctuation. In addition, the "gold-rush" days are over, as there are now so many good cultivars that new releases cause little excitement. Finally, the advent of Plant Variety Rights (PVR) has removed the prospect of exploiting high prices in the early stages.

The best buffer against fluctuation is carry-over of seed. The only problem with carry-over is that no one wants to bear its cost. The two components of cost are the "dead money" tied up in ownership of the seed, and the cost of storage itself. There are also risks, both of the seed deteriorating and of it losing value through some change in market position. Alternatively, it may gain in value.

The burden of carry-over has tended to shift from merchant to grower over time. The trend began in the mid 1970s with loss of buying power of money through inflation, high borrowing costs, and uncertain sales because of the beef slump. Merchants found it economically untenable to hold large stocks of unsold seed. Policies differ between companies, with some flexibility over buying, making commitments to buy, accepting "on consignment" and reserving decisions. All buy to secure stocks in times of scarcity, and when they have imminent sales. Growers' practices are usually more passive — they carry over out of necessity when they cannot sell.

A few growers producing large quantities of seed carry it over as a matter of deliberate long-term policy, especially seed of lines in which their specialisation and scale give them a major stake. This often has a stabilising effect on both price and supply. Verano stylo (*Stylosanthes hamata*) is a good example. Over much of its history since 1974, the size of the market each year has been dominated by the development policies of a few big grazing companies. If they decided to develop pasture areas, each might buy 30 t of seed; alternatively, they might buy none. Other sales, even in total, were relatively small. This meant that annual demand fluctuated enormously — perhaps between extremes of 20 and 100 t. Yet, because of deliberate carry-over, off-farm price has been the most stable of all cultivars.

At the opposite end of the range is lablab (*Lablab purpureus*). An annual crop favoured by non-specialists, and very susceptible to loss from frost, it undergoes massive fluctuations in production. Demand, if price remained stable, would probably be fairly constant. However,there is no single grower big enough to stabilise the market with his carry-over, nor enough deliberate consistent carry-over in total. As a result, prices may change five-fold in the space of two seasons.

The side effects of fluctuations are not all bad. Promise of high price in the past has been a strong incentive for technical innovation, the consequences of which have ultimately reduced prices to the user. Over-supply of signal grass (*Brachiaria decumbens*) seed has recently led growers to compete for sales by raising their standards of quality, which have then tended to become the expectation. Customers exploit periods of over-supply, taking advantage of low prices as some have done recently to obtain Seca (*Stylosanthes scabra*) seed. Long periods of depressed prices are totally counter-productive, however, and lead finally to shortages as producers turn to other sources of income.

In summary, it is not possible to eliminate fluctuation or to tailor annual production to annual demand. However, where long-term markets are sure and industry members secure, carry-over can greatly stabilise the position.

Limitations on supply

In general, seed of cultivars with large markets is readily supplied, but cultivars for restricted use present production problems. On the one hand, insoluble problems may prevent a plant from becoming a candidate for the large markets. On the other, the financial incentives to solve problems, or even simply produce seed, for the small markets are lacking.

Belalto centro (*Centrosema pubescens*) provided an excellent example of the latter scenario. There was a widespread belief over a long period that Belalto was a far superior cultivar to common centro for use in wet tropical coastal pastures. Seed production was promoted in the early 1970s, but failed. This failure was not due to technical problems, but to a lack of financial incentives. Seed growers looked at the market and perceived it to be local, small, and of short duration. Moreover, past experience suggested that, however superior Belalto might be, its seed price would inevitably be linked to that of common centro. Since common centro was imported and sold for prices below local production costs, they decided that Belalto was a bad risk.

Johnstone hetero (*Desmodium heterophyllum*), targeting the same market and with far greater production problems, followed Belalto into oblivion. Perhaps Shaw vigna (*Vigna parkeri*) and Bargoo joint-vetch (*Aeschynomene falcata*) will have a similar history, or perhaps someone will overcome their problems, develop a market, and carve out a profitable niche.

Sometimes there are geographical limitations. Although eastern Australia provides a very wide range of conditions, there are still a few deficiencies. Para grass (*Brachiaria mutica*) seeds satisfactorily only in the wet, warm lowland tropics, where there are very limited areas available for seed production and very few producers. Even in suitable areas, risks of crop loss from rain or boggy ground at ripeness are high. The consequence is inevitably erratic seed supply. The problems could probably be solved by use of irrigated rice-bay systems in drier districts, but the limited market makes the effort unattractive.

Common guinea grass (*Panicum maximum*) raises another set of difficulties. It normally has a reasonable market and commands an attractive price. However, in the districts where it is grown extensively, the reliability of seed yield and quality is low owing to risks of high rainfall and overcast weather at the critical development stage. In drier, sunnier districts it produces excellent quality seed, but short wet seasons often prevent any production. Good sprinkler irrigation in the dry districts would be a technical answer, but very few farmers in these districts have chosen irrigated guinea grass over alternative crops which provide easier and more secure sources of return.

As each new cultivar appears, the questions of limitations on supply re-emerge. However, the prospects for solving technical problems are now generally good, and far better than they were twenty or thirty years ago, for the following reasons:

- The industry as a whole has a far greater capability.
- Growers are more experienced, professional and sophisticated.
- A greater body of knowledge derived from research and experience is available.
- There is a greater range of more versatile machinery.
- Emerging cultivars are systematically evaluated for seed production capability before release.

As a result, the technical barriers are seldom insuperable. The impediments that remain and restrict supply usually result from lack of incentives.

Limitations on demand

Demand has many facets — climatic, economic, educational, biological. Any of these can have a dramatic effect on industry's requirements.

The *mood* of the grazing industry has major effects. Pessimism brought about by changes in world beef markets, for example, can reduce demand for seed as rapidly as it reduces cattle prices. In this regard, recent confusing, contradictory and probably mostly ill-informed publicity about the Southern Oscillation is widely believed to have reduced spending by cattlemen. More tangible factors like drought or low cattle

prices obviously drive cattlemen into survival mode, a condition in which they have much experience and expertise and which invariably includes cut-backs on pasture development.

When a cultivar fails or is obviously superseded, demand falls, but ironically success can have the same effect. There is, for example, very little local demand for glycine (*Neonotonia wightii*) seed on the Atherton Tableland for the simple reason that there is seldom need to sow it: it is already virtually everywhere it is needed, and beyond, persisting through hard seed even after cycles of cultivation.

Domestic and export markets

There is sometimes criticism of the export of seed — benefiting our rivals with the fruits of a technology our grazing industry has paid for; using seed that might otherwise be sown at home; etc. The truth is that export markets are needed to raise the scale of business conducted to a profitable and relatively stable level and to ensure continuity of the seed industry. Without export markets after the 1974 collapse in cattle prices, which drastically reduced domestic seed sales, large sections of the seed industry would not have survived to service the demand that again developed domestically by about 1980.

A point to note about export markets is that buyers want only a few species, mostly grasses. Most Pioneer rhodes grass (*Chloris gayana*) presently entering the trade is exported, for example, as is a substantial proportion of signal grass.

Changes

Improving the product

As the consumer becomes discriminating, the old take-it-or-leave-it attitudes become untenable. The grazing industry has in fact only recently begun to discriminate, and has still a long way to go. In this regard, current rumours of the imminent removal of minimum standards are disquieting. The standards were set in place to protect unsophisticated consumers, of which there are still many. The policy taken by the seed trade will be vital to marketing stability if the standards are dropped. The Seed Industry Association of Australia (SIAA) has traditionally supported the retention of standards for tropical species, but recently it has been obliged to change its policy because of the implications of the agreement between states on the mutual recognition of one another's standards. This will create serious inconsistencies in the standards applied to seeds depending on whether or not they have been traded interstate. The consequence is that SIAA plans not to oppose the removal of government standards, and upon their removal to impose upon its members standards equivalent in most respects to the present Queensland regulations as part of the code of practice to which it is committed.

In anticipation that discrimination will continue to grow and choice be made on bases other than just price, we must consider what the consumer will demand. First, we must assume that high quality will be required — seed of high purity and high viability, free from weed or other crop seeds that the consumer has chosen to avoid. The present labelling regulations make it easy to exercise choice, provided consumers know what they want and understand the jargon. The knowledge that more information can be obtained from a seed analysis report should also increase discriminatory opportunities.

Other properties of seed can be usefully improved as well. As knowledge improves of the type and proportions of soft and hard legume seeds required for various situations,the producer or processer can endeavour to tailor the product to the requirements for particular situations.

Seed coating is another potential route to product improvement. This is despite its history of largely unnecessary or ineffective treatment and misleading changes in seed numbers per unit weight that have often led users to sow fewer and more expensive seeds than they intended. The point about coating is that it should be done for a specific purpose, whether ballistic, protective or nutritional; and its value to that end should have been clearly demonstrated (as opposed to inferred) before it is promoted. In this regard there are many directions not worth taking. For example, it is unnecessary or impossible to protect legume seed from seed-harvesting ants when sown into undisturbed woodland during the dry season. In the same conditions, it is inappropriate to inoculate with rhizobium, since the inoculum is most unlikely to survive. It is probably less desirable to encapsulate the seed in a nutritional

package for the same use when mere mixing with fertiliser does the desired job. On the other hand, there are situations where inoculation or insecticide use may be entirely justifiable.

The processing of seed to improve flow characteristics is another potentially useful practice. Hook-podded stylo can be made more suitable for aerial sowing by hammer milling, for example. Increasing interest in chaffy grasses creates some urgency for improvement. The various blue grasses (*Bothriochloa pertusa* and *insculpta* cultivars) need, and are receiving, attention.

As carry-over of seed and demand for high quality increase together, more attention must be paid to storage. Progress in refrigeration and insulation has increased the attractiveness of cool storage as a possibility for grass seeds. Knowledge of the costs and consequences to quality is adequate to allow policy decisions to be made for any set of conditions. There is no barrier to individuals examining their own requirements and deciding on a course of action — whether attention solely to good drying (all that is necessary with many legumes) or some form of reduced temperature storage.

Seed distribution without deterioration is generally becoming less of a problem at the domestic level. Rapid efficient transport throughout Australia is now the expectation, thanks to more open competition. This has reduced greatly the need for local retail outlets. Improved handling technology (e.g. shrink-wrapping of pallet-loads) has reduced costs and risks. A problem arose with exported seed some years ago when shipping companies moved to containerisation. There were risks that seed might travel in the disastrous environment of a hot, leaky container carried as deck cargo across tropical seas. Fewer complaints seem to surface about the consequences these days, however, and it is assumed the system has been improved.

Seed certification is generally considered a route to product improvement. Most pasture seed marketed in affluent countries is certified, and tropical species in Australia are the exception. Pedigree certification has been demanded with tropicals only where the consumer has feared substitution or adulteration with a cheaper line. In other words,the concern is more about being cheated than about genetic purity. Consequently certification has persisted only for cultivars where this risk applies — the more expensive setarias and rhodes grasses.

Otherwise the consumer has cared nothing for certification. On the whole, this tends to be sound policy. There are sometimes good reasons *not* to certify. It is an extra cost. In some cases, genetic purity or stability is undesirable. Take the case of Seca stylo. Present Seca is highly variable and very different from what was originally released. This is its virtue. It changed of its own accord from a late to an early flowering type, which enabled it to regenerate in central Queensland and enormously widened its range of usefulness. Had it been conventionally certified, this would not have been allowed to happen. Deviant crops would have been condemned, and Seca would still have a narrow range of adaptation. In other circumstances, certification is a necessity. It has, for example, prevented a repetition of the loss of cultivar integrity of Callide rhodes grass such as occurred in the 1960s. The lesson is to treat each situation on its merits in deciding on certification.

Throughout the industry there is an opinion that certification for certification's sake is a pointless extra expense, and that it should be avoided where possible — for example, if cultivars are distinguishable on seed characters.

A side effect of lack of certification is the absence of records on production, the absence of a framework on which to base a research levy, and numerous inconsistencies over standards and regulations that interfere with the presently desired uniformity between states. Whether elimination of these is justification for the adoption of a costly charade is a moot point. Perhaps a compromise could be reached through a validation and recording system that added a smaller cost than that of conventional certification.

Research and development support

Publicly financed R & D has clearly played a part in satisfying industry's seed requirements, and continues to do so. There has been a level of industry support, but more from the grazing industry than the seed industry. Take the example of QDPI's two seed production units. Their running costs over twenty years have been borne primarily by the State Treasury (about 90%), while the Meat Research Corporation and its

predecessors have contributed most of the balance. Seed merchants have provided grants for specific tasks that have been valuable for the purpose but minor in the overall context.

There are signs that governments will reduce their contributions to activities such as these. If industry wishes to retain its R & D facilities, it must contribute more. Seed producers have long expressed their willingness to contribute by means of a levy. The problem has always been of how to collect it. The absence of widespread certification or maintenance of reliable statistics leaves no framework for attaching a conventional levy. A solution to this problem must be found if R & D support is to be maintained. At present there is no realistic long-term answer.

Plant Variety Rights

Few subjects have raised such strong feelings in the industry as Plant Variety Rights (PVR). PVR legislation is now a fact, and has been applied to tropical pasture cultivars. With the limited experience gained, the opposing views have moved closer together. In particular, there has been a general realisation that the arguments are more about exclusive licenses than PVR itself.

Essentially, PVR allows a breeder to give an operator exclusive rights to market a cultivar for which he pays an initial license fee plus a royalty on seed sales to the breeder. The arguments in support of this system are that this: sustains an on-going breeding program; provides the licensee with an incentive to promote the product to which he has the sole marketing rights; and allows the licensee to control production and adjust it to demand, thus providing greater efficiency and less waste. The arguments against are that it: is monopolistic (with all its implications); tends to transfer power to the bigger merchants; will raise very little revenue; and destroys an excellent well-proved existing release system.

A critical factor in the debate is *scale*. Will production of a new cultivar be sufficiently large to generate enough revenue to make the exercise profitable to the breeder? Are there enough competing cultivars for monopoly over one to be compatible with the principle of healthy competition? The conclusions reached from the same premises depend very much on the scale of the operation under scrutiny. Generally,the bigger merchants and the metropolitan bureaucrats of the breeding organisations tend to favour PVR, while producers, small merchants and field scientists oppose it.

The oldest PVR protected cultivar is in its fifth year of commercial seed production, and six cultivars are now advanced enough in the system to provide some, albeit slight, experience. The revenue from PVR has so far been minuscule. The prospective licensees have realised that the likely returns and risks are such that a high initial license fee is not justifiable in terms of business prospects, and are no longer making high bids for new cultivars. There are cases of both gross overestimation of market potential and damaging consequent over-production, and of circumspect build up being matched to promotion and demand. Lessons about contractual arrangements, about which few in tropical pasture seeds have experience, are being learned. Points previously hidden are being revealed. For instance, contracted growers have realised that, if the licensee does not want the seed they have grown, they cannot offer it to anyone else; and if their contract expires, they must plough out the crop. Growers can no longer expect initial high prices, the former incentive for putting effort into developing management methods. Indeed, they have learned that, where two similar cultivars compete, one PVR-protected and one free, they must accept a lower price for the protected one in order to cancel out the extra costs of protection.

The advantage to smaller businesses in collective tendering for new licenses has led to new unions between groups of seed companies and between farmers and companies. The former will remove absolute exclusivity, and thus be welcomed by many smaller members of the industry.

The early enthusiasm for PVR has been tempered. Very few people now see large profits in exclusive licenses, for either breeder or licensee. The remaining issues are about promotional incentives, distribution of power between sectors of the industry, etc. Perhaps the best advice is to wait, observe the development of the early cultivars, analyse these observations after another few years, and then re-formulate policy.

Conclusion

The seed industry has matured over the last twenty years. There is much more professionalism at all levels. Technical expertise and opportunities have improved enormously. Relationships between different sectors of the industry are more cordial and constructive. The net consequence is better and cheaper seed to the user, fewer shortages, and shorter lead times from development to availability. There are still difficulties and imperfections, arising mainly out of the small size and diversity of the markets and the fundamentally unstable supply and demand position for individual lines. The grazing industry is becoming a more sophisticated customer and is beginning to discriminate in its buying on the basis of quality and suitability of seed as well as price. All these things are contributing to more effective pasture improvement and hence to the greater efficiency of animal production in northern Australia.