Bovine tuberculosis eradication in Australia

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Summary: The national bovine tuberculosis and brucellosis eradication programme in Australia was developed in 1968 and officially started in July 1970 on a regional basis. The method of prophylaxis of bovine tuberculosis consisted of a strict identification and systematic tuberculin testing of cattle as well as the inspection of carcasses at the abattoir in order to find the original herd of tubercular animals.

The author presents the different stages and the financial cost of the bovine tuberculosis eradication programme. At the end of 1985, the situation of the disease was very satisfactory in the various regions of the country, the principal obstacle to total eradication being in the north of the country where conditions (monsoon climate, difficulty of access to certain areas) and breeding (semi-feral herds of cattle, difficult to round-up) make it impossible to regularly carry out tuberculin testing. The presence of a large population of buffalo and cattle living in the national parks and aboriginal reserves poses additional problems, especially financial. New control methods are envisaged, combining classic tuberculin testing with the partial or total elimination of infected herds. The deadline of 1992 for the complete eradication of bovine tuberculosis and brucellosis in Australia would appear to be a reasonable objective.

KEYWORDS: Australia - Brucellosis - Buffalo - Cattle diseases - Diagnostic techniques - Disease control - Economics - Tuberculosis.

Bovine tuberculosis (TB) was one of the many diseases introduced into Australia by early cattle importations from the UK. By 1880 there was a high prevalence but, until the first use of tuberculin, control was limited to abattoir condemnations and slaughter of clinical cases. Reactor levels, such as the 5.76% found in dairy cows supplying milk to Melbourne in 1937, provided a rewarding base for early tuberculin testing programmes. These expanded after the war with increased numbers of veterinarians and there was a substantial reduction in prevalence in dairy and beef herds in southern Australia. Nevertheless, the clinical disease was not uncommon into the 1950's; the author removed 125 reactors from a stud beef herd of 400 in northeastern Victoria in 1951; all had lesions at autopsy.

In 1968 the first steps were taken towards a national TB and brucellosis eradication programme (BTEC), the official Australian co-ordinated plan commencing in July 1970. This stemmed from the confidence of a national approach with the successful progress of contagious bovine pleuropneumonia eradication. It was spurred on by the fear of losing valuable beef export markets in North America and Europe where TB eradication was much more advanced.

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The concept of regional eradication found so useful with pleuropneumonia was adopted for TB. Regions were to pass through stages:

- Residual areas (unknown prevalence, no quarantine or compulsory testing);
- Control areas (variable prevalence, compulsory testing);
- Eradication areas (less than 2% prevalence, compulsory testing);
- Provisionally-free areas (less than 0.1% prevalence, compulsory testing);
- Free areas.

The programmes depended on satisfactory control of cattle movements, continued tuberculin testing until a whole herd passed at least two clear tests, and surveillance and trace-back from abattoir diagnosis.

Identification of cattle was indispensable to trace-back and epidemiological investigations. Except in northern Australia where firebranding was compulsory and effective, tail tagging was required for all cattle leaving properties; every property was given a unique tail tag identification.

Excellent progress was made with both diseases from the inception of the national programme. In 1974, the Commonwealth Government referred the matter of continued financial assistance to the newly created Industries Assistance Commission (IAC). Projected eight year (undiscounted) costs of eradication programmes for both diseases were about $170 million. It was recommended, and Governments accepted, that the national programmes continue to be financed providing provisionally-free status for both diseases to be the objective for 1983. At that stage Tasmania was TB-free and Victoria and New South Wales had virtually acquired provisionally-free status.

The IAC inquiry and conclusions ensured the government commitment to finance and the programmes entered the first 8-year phase to 1984. A second IAC inquiry in 1982 endorsed funding with a 1992 total eradication objective.

Inflation added substantially to real costs. From 1970 to June 1985 total costs were $377 million and estimates to 1992 are an additional $362 million. In 1985 dollars, the BTEC cost to date has been about $500 million, not including on-property costs.

The financial scale of the BTEC programme is shown in the funding for 1985/86. Industry funds provided $26 million, the Commonwealth $16.5 million and the States/NT $19.4 million. This total $62 million was expended in operations ($37 million), compensation ($17 million) and special additional assistance of $8 million to northern producers. The weight of expenditure was in the north with allocations of $22 million to Queensland and $17 million to the NT.

By the end of 1985 the actual TB status of the various regions of Australia was very satisfactory.

The whole of Australia has been declared provisionally-free of brucellosis with only 229 known infected herds (containing 193,000 cattle) of the national 150,000 herds.

In 1984/85, 4.8 million tests for brucellosis were completed, 32.6% of these from abattoir monitoring. Vaccination was almost completely terminated, the figure of 2.1 million in 1975/76 having declined to 1,674 head — highlighting the great susceptibility of our national herd to brucellosis.
For tuberculosis, at June 1984, 384 known infected herds contained 2.2 million cattle, illustrating the residual infection being in large herds in the north. Abattoir monitoring has shown a decline in positive cases detected and confirmed by culture: in 1983/84 the level was 0.03%.

In 1983/84, 2.17 million field tuberculin tests produced 5,520 reactors in which only 27.8% had detectable lesions of TB.

Private veterinarians played a major role in the early campaign, but their involvement has necessarily diminished with disease reduction. In 1985/86, $4 million will have been used for private veterinary contracts, mainly ($3.85 million) for tuberculin testing in the north.

The cattle industry has consistently carried the major burden of finance, most of it being raised through a slaughter and export levy introduced in 1973 and currently at $4 per head. This fund provides about 70% of the operational costs, the remaining 30% coming from the States/NT. The Commonwealth and State governments have totally funded compensation since 1975, currently on a 3:1 ratio. The cattle industry has carried additional on-property costs of improvements and extra management essential for disease control. Although the major beneficiary of eventual eradication, the cattle industry deserves much better recognition for its input and cooperation and a degree of constructive participation envied by many foreign governments.

Despite occasional property breakdowns the programme in southern Australia has been unexceptionable. The tuberculin test is satisfactory where full musters can be relied upon and cattle retested frequently with high quality PPD tuberculin.

In northern Australia all these prerequisites cannot be observed and progress is slower than hoped. Most of the cattle in the north are semi-feral, endeavour to escape from mustering and resent yarding and handling. The terrain is difficult with many regions being almost unmusterable even with aircraft and helicopters backing up horsemen. The wet monsoon/dry season weather pattern means that cattle cannot be handled for two periods each year — the wet season through inaccessibility and the end of the dry season through nutritional stress — all of which makes repeated application of the tuberculin test unrewarding.

The problems of the tuberculin test are the interval between injection and examination and the resultant cattle holding difficulties but, more importantly, its occasional failure to detect infected animals. When added to incomplete musters, the probabilities of infection persisting are increased and annual or even twice annual testing on difficult properties does not reduce reactor rates.

Progressive cattle station managements have dramatically changed their operational style and moved to a two herd system, replacing their older untested herd with rigorously tested segregated young breeders. This is not easy on properties with 40-70,000 cattle, and where brucellosis programmes have to run hand in hand with TB control.

An eradication tool more recently used has been total or partial destocking. This is expensive in the short term because of the compensation costs, but can have economic advantages for disease control in avoiding protracted testing programmes. However, it brings medium to long-term financial liquidity problems to the owner and there are difficulties in restocking as well as in maintaining the property secure from further invasion from neighbours' infected feral cattle.
The extent of destocking needs to be kept in perspective. In 1985/86 only 235 properties with 1.7 million cattle are under consideration for this type of programme. Most of the activity is to be partial destocking; in 1985/86, 177,000 of the eventual 600,000 cattle will be removed by this method.

In the long term, a combination of conventional testing programmes and partial or complete destocking will be followed in the north.

The recently formed Brucellosis and Tuberculosis Eradication Campaign Committee has a multidisciplinary representation to ensure all aspects of the campaign, including socio-economic aspects, which are given full consideration in campaign planning. The provision of assistance measures for remote area producers recognizes the special problems associated with tuberculosis eradication in northern Australia.

Research development of a more efficient diagnostic test would be of great benefit to Australian and international programmes. The new biotechnologies give rise to some optimism. The ideal of a reliable test that would not miss advanced cases and could give a result in a few hours would remove the cattle holding problem, tip the probability scales in the incomplete mustering problem and lift the confidence of field staff and stock owners.

The buffaloes are a major constraint to the final solution. They were probably infected originally with TB by the setting up of a dairy herd at Oenpelli on the western border of Arnhem Land, in the heart of the buffaloes' preferred habitat. An estimated 250,000 buffalo have a regionally varying TB prevalence. In some areas they are TB-free and, in the worst parts, the rate is up to 20%. The Northern Territory is developing a plan for eradication, but this is complicated by the remoteness of the location, the conflicting objectives of national park administrations and aboriginal interests. Many of the buffaloes will have to be removed or they will present a continual reinfection threat to the national cattle herd. Residual TB free herds are already being developed as the buffaloes are a unique Australian livestock resource and have long-term potential for meat and for live exports to Asia.

The problem of feral cattle and buffaloes on land not used for commercial purposes (e.g. national parks, aboriginal reserves) imposes additional problems on Governments and other communities in northern Australia resulting in serious disruption and considerable expense to all.

The cattle industry is essential to the economics of northern Australia and the campaign must not be responsible for forcing producers off their properties.

A Bureau of Agricultural Economics report of 1986 examined the costs and benefits of the campaign. The conclusion reached was that while risks of losing export markets remain, the benefits to continue to final eradication are substantial.

Exclusion from export markets is still a possibility if tuberculosis is not eradicated. This could affect approximately $2000m in export revenue for animal products and live cattle and buffalo exports. However, there appears to be no technical reason why animal products should be excluded from export markets.

Australia's major markets and competitors are nearing completion of their tuberculosis eradication campaigns. The USA commenced its campaign in 1917 and in 1985 had only thirty infected herds. Canada is anticipating a declaration of freedom from tuberculosis in 1986; Japan reports a small number of infected animals each year usually in imported animals. Most of the European countries are free although breakdowns do occur. New Zealand has persistent problems with tuberculosis in possums and England with tuberculosis in badgers. Despite these problems, programmes are well advanced.
Tuberculosis has not been completely eradicated from any large cattle population in any country. We can anticipate that Australia will experience some breakdowns for some years. However, provided animal health authorities remain alert to the possibility of breakdowns and systems remain in place, these can be readily eradicated.

The final target date of 1992 for complete freedom from both TB and brucellosis is still within reason. All targets have been achieved throughout these campaigns. Brucellosis should certainly be eradicated but we will have to guard securely against reinfection as our cattle are now highly susceptible.

Freedom from TB will be more difficult to achieve because of the nature of the organism and the nature of our northern environment and its cattle and buffalo industries. However, by 1992 there should be no known infected herds and we will have in place monitoring, trace-back and regulatory procedures to successfully contain and control detected infection.

ÉRADICTION DE LA TUBERCULOSE BOVINE EN AUSTRALIE. — R.W. Gee.

Résumé : Le programme national d'éradication de la tuberculose et de la brucellose bovines en Australie a été élaboré à partir de 1968 et officiellement lancé en juillet 1970, selon une approche régionale. La méthode de prophylaxie de la tuberculose bovine a consisté en une identification stricte et une tuberculisation systématique des bovins ainsi qu'une inspection des carcasses à l'abattoir pour retrouver les troupeaux d'origine des animaux tuberculeux.

L'auteur présente les différentes étapes et le coût financier du programme d'éradication de la tuberculose bovine. A la fin de 1985, la situation de la maladie était très satisfaisante dans les différentes régions du pays : les principaux obstacles à l'éradication finale se situent dans le Nord du pays où les conditions particulières du milieu (climat de mousson, difficulté d'accès à certaines zones) et de l'élevage (troupeaux de bovins semi-sauvages difficiles à rassembler) empêchent de réaliser régulièrement les épreuves de tuberculisation. La présence d'une importante population de buffles et de bovins vivant dans les parcs nationaux et les réserves aborigènes pose des problèmes supplémentaires, surtout financiers. De nouvelles méthodes de lutte sont envisagées, associant la tuberculisation classique à l'élimination partielle ou totale des troupeaux infectés. La date limite de 1992 pour l'éradication complète de la brucellose et de la tuberculose bovines en Australie semble un objectif raisonnable.


ERRADICACIÓN DE LA TUBERCULOSIS BOVINA EN AUSTRALIA. — R.W. Gee.

Resumen : El programa nacional de erradicación de la tuberculosis y brucellosis bovinas en Australia empezó a elaborarse en 1968, siendo promovido oficialmente en Julio de 1970, según un enfoque regional. El método de control
de la tuberculosis bovina consistió en la estricta identificación y la sistemática tuberculinización de los vacunos, así como en la inspección de las canales en el matadero para indagar los rebaños de origen de los animales tuberculosos.

Expone el autor las distintas etapas y el costo financiero del programa de erradicación de la tuberculosis bovina. A finales de 1985, era muy satisfactoria la situación de la enfermedad en las distintas regiones del país: los principales obstáculos a la erradicación final se situán al Norte del país donde las condiciones peculiares del medio ambiente (clima de monzón, dificultad de acceso a algunas zonas) y de la crianza (rebaños de vacunos semisalvajes difíciles de concentrar) impiden que se realicen con regularidad las pruebas de tuberculinización. La presencia de un importante censo de búfalos y vacunos que viven en los parques nacionales y las reservas aborígenes plantea problemas adicionales, sobre todo financieros. Se contemplan nuevos métodos de lucha, en los que se asocia la tuberculinización clásica a la eliminación parcial o total de los rebaños infectados. La fecha límite de 1992 para la completa erradicación de la brucelosis y tuberculosis bovinas en Australia resulta un objetivo razonable.

PALABRAS CLAVE: Australia - Brucelosis - Búfalos - Control- Economía - Enfermedades de los bovinos - Técnicas de diagnóstico - Tuberculosis.