

APPLICATION OF A COMPUTERIZED HERD MANAGEMENT & PRODUCTION CONTROL PROGRAM IN COSTA RICA

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INTRODUCTION

The development of computerized data recording techniques in recent years has greatly facilitated concise monitoring of herd health and production parameters. Various computer software programs have been described for use in large animal practice¹. Whether the program was developed for analyzing reproductive health in dairy herds² or to estimate the cost of raising dairy replacements³, each aimed at improving farm management and optimizing farm income. A herd health and production management program for dairy farms has been described extensively elsewhere⁴. The program is supported by a software package called VAMPP (Veterinary Automated Management and Production control Program), which has been adapted for use in microcomputers.

Presently this program is being used widely in the Netherlands and other countries for monitoring dairy cattle and swine farms⁵. A Spanish version of VAMPP, was introduced in 1987 in Costa Rica by the Veterinary School of the Universidad Nacional (UNA) as part of a teaching and research program in herd health and production management.

With an annual per capita gross domestic product of US \$ 1424 in 1988⁶, Costa Rica still qualifies as a developing country. However, unlike many other developing countries, Costa Rica can boast a stable democracy, a literacy rate of 93 % in 1989⁶, a good road and communication system and a fairly reliable and extensive electricity supply. This infrastructure in combination with the importance of the livestock sector for both the national requirements and the export industry provide a suitable basis for the introduction of a sophisticated computer program to assist farmers in improving farm management. Optimizing the livestock industry is of paramount importance to Costa Rica since an annual human population growth rate of 2.25 % in 1990⁶ and pressure for agricultural land has resulted in extensive deforestation during the past decades. An effective measure to prevent further deforestation, is to optimize the production of existing livestock units per hectare.

Computerized recording techniques can provide the farmer as well as the extension worker with production figures to monitor the performance of individual cows, while herd averages can be compared with regional index figures or livestock industry production goals. Thus, livestock production and farm income can be assessed and optimized using the existing pasture areas without the need for expansion.

MATERIALS AND METHODS

Computerized control program

An interactive multi-user database management system, called MUMPS, was used to develop a software program (VAMPP) for data collection, storage and processing⁵. MUMPS is both an operating system and a high level computer language facilitating easy adaptation and extension of VAMPP⁵. The principles of veterinary herd health and production management on dairy farms, which forms the basis of the computer program has been described elsewhere⁷. The program provides action lists for farmers and veterinarians, herd reports and analyses of index figures can be produced easily, while epidemiological analyses or comparisons between farms are feasible.

Introduction in Costa Rica

Presently the dairy cattle version and the swine version are operational throughout Costa Rica. The version for dual purpose cattle is being developed as part of a university sponsored research study. At two pilot projects initiated by the UNA, herd dynamics information is gathered at 44 cattle farms (6000 animals). Additional information collected includes regular bodyweight measurements of young stock as well as blood sampling as part of a separate investigation assessing the prevalence of subclinical viral diseases in cattle such as vesicular stomatitis and leucosis. Daily milk production is being measured once or twice monthly at 24 specialized dairy farms located near the major urban area at the central plateau.

All data are entered on laptop computers either by technical assistants during the farm visit or by the farmer himself, or in personal computers by the veterinarian at his office. Following each farm visit, the farmer is provided with an updated action list. Similarly, an action list is printed for the veterinarian indicating animals to be checked for pregnancy, reproductive disorders and health problems (mastitis, lameness, rearing of offspring, etc.).

Dairy farmers are required to pay the University the cost of one liter of milk per adult animal per month for the technical assistance in herd health and production management using the VAMPP computer program. On pig farms a flat rate of US \$ 25 per month is collected during the current introductory stage of the computer program in this sector of the livestock industry.

Outside the pilot projects various zootechnicians and veterinarians have purchased the rights to use VAMPP on a private basis for herd management control. The data collected by the private sector as well as the results from the two pilot projects serve as an input for an information network with its central database located at the University. Thus, information on herd dynamics from 192 cattle farms (26.000 animals) and 8 swine farms (2000 females) has been gathered.

RESULTS AND DISCUSSION

During the initial stages of its introduction in Costa Rica, VAMPP has proven to be a valuable tool for extension work in the two pilot projects. The farmer is forced to keep proper records by writing down daily events in a farm diary. These events are entered in the computer by the technician employed by the university. The farmer uses an action list provided by VAMPP to closely observe certain animals that need attention or to gather them for examination by the veterinarian. The latter visits the farm on a regular basis to check individual animals using an itemized action list provided by VAMPP. At the same time farm management is being assessed and shortcomings or improvements are discussed with the farmer. In this way the farmer's awareness of health and production problems at the farm is induced at an early stage. A recent survey of VAMPP users at 132 farms in Costa Rica revealed that at 66% of the farms the software package was used for specialized dairy farming and at 42 farms for the monitoring of dual purpose cattle. Moreover, the survey showed that in all cases the VAMPP package including the MUMPS language and its application required less than 7 megabytes, leaving open the possibility to use the computer for other purposes. Indeed, the microcomputers appeared to be used to run other applications, e.g. accounting and wordprocessing.

Furthermore, the findings of the survey showed that while the VAMPP package was used under various environmental conditions and with variable electric power supplies no logical or physical errors were reported in the individual data base by each user. To increase the effectiveness of VAMPP, meetings with farmers from the pilot projects are organized twice yearly to discuss general subjects relevant within the region and specific topics of interest to individual farms. The importance of farmers meeting one another at these gatherings for promoting the acceptance and usage of the herd health and production management program should not be underestimated.

It is obvious that the application at farm level of a computerized herd health and production management program in third world countries can only be successful when farmers are literate and when veterinarians are able to visit farms on a regular basis and are trained in all aspects of preventive veterinary medicine. On the other hand, the successful uptake has been reported of a microcomputer database package to assist livestock management decisions under more demanding conditions than exist in Costa Rica⁸.

A second application of VAMPP in Costa Rica is as a teaching tool either for veterinary students or for zootechnicians and interested farmers. When visiting a farm with a health or production problem small groups of students are encouraged to assess the situation by examining animals and farm conditions. Subsequently, relevant data can be entered for the particular farm in VAMPP and up to date index figures and analyses can be produced for group discussions. Thus, students can be coached in problem solving using a computer program and existing farm conditions.

A third application of the computer program is as a research tool. The large data set collected at various farms can be used to calculate average production figures for each species, age group, farm or region. Seasonal fluctuations in production and health parameters can be assessed. Risk factors affecting animal health or production can be analyzed using specialized statistical software programs^{9,10} and interactions between health, production or environmental conditions can be investigated.

For example, an initial analysis of data collected on Costa Rican dairy farms revealed extended calving intervals of 393 days (SD=18.86) and a mature age at first calving of 987 days (SD=171.14) in the Poás area, which is a dairy region with a relatively high average milk yield. The predominant breed in the region is Holstein cattle producing on average 4934 kg milk per lactation. Reproductive inefficiency, clinical mastitis and lameness are the major health problems to be investigated more thoroughly. Recently a cross sectional survey of foot disorders in 759 dairy cattle was initiated at farms

participating in one of the pilot projects. The two lameness disorders with highest prevalence in dairy cattle were found to be pododermatitis aseptica diffusa (laminitis) and dermatitis interdigitalis (heel erosion) being present in, respectively, 77.1 and 52.0 % of the animals examined¹¹. The results of the survey were linked to the data present in the VAMPP data base enabling the identification of risk factors for each one of the diseases.

Finally, data provided by VAMPP and gathered in the central database at the University can be used by policy makers to provide a source of statistical information. Moreover, once sufficient data have been accumulated, the program will ultimately generate reference values for animal health and production parameters applicable to Costa Rican conditions.

In conclusion, application of VAMPP under field conditions in Costa Rica has indicated its usefulness for improving farm management. Due to the high flexibility of the computer program, it is possible to develop various additional modules to enhance the basic program. Under development are genetic, nutritional and economic farm assessment modules. Following its successful application in Costa Rica during the past four years, VAMPP is presently introduced in various Central and South American countries.

SUMMARY

A computerized herd health and production management program developed in The Netherlands has been validated in Costa Rica for its usefulness in assisting the farmer in optimizing farm management. During the past four years the farm community became acquainted with the computer program in two pilot projects initiated by the School of Veterinary Medicine of the Universidad Nacional. Apart from its value for extension work, the program was also useful for teaching and research purposes and as a basis for decisions by policy makers. Due to the immediate benefits of the program to the farmer, the program is presently being introduced throughout the country and within the South American region.

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