

**University of West Hungary
Faculty of Forestry**

Thesis of the doctoral (PhD) dissertation

**Summary study and the possible solutions of the
problems resulting from the overpopulation of
cervidae**

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Initiation, programme

The game farming of Hungary went through significant changes in the last few decades. Several success has been reached but lately problems and tension describes this procedure of changes as well. Within the scopes of our trophy-centered farming we can consider the world records of hind-and fallow-deer, roe-deer and wild-boar as success, but we can also be proud of Hungary's market-leading position in the trade of hunting. In the same time we can not pass next to the problems has distressing effects on our game farming! Most of the problems occur in game farming are in connection with the maintainable stock of game, specifically with the number of the stock of big game and its overpopulation. We can not let the questions in connection with the silviculture, the agriculture and nature preservation to be swept behind any achievements or paper-successes, because we have not yet learned the answers or only know few of them. Statistics make it clear that the number of all the breeds of big games of our country kept growing strong in the past four decades- especially since the 90's. The exact reason and the way of solution has not or partly been known. Our foregoing knowledge developed models of stock managing and experience are not enough anymore to give proper answers. The most important task of our days to make the new, ecology based game farming commonly understood and accepted, much rather to make it generally used in practice. In this respect the stock of game is a kind of natural resource to be preserved. In the course of managing the stock of game it is necessary to think in

ideas like receipts and expenses, output-cost, proceeds or loss, just like in other fields of economy. In the same time games in season are parts of a very complex system, the ecosystem-in which the preserving of biodiversity is a special task of our days, and assumes a close cooperation between game farming and nature preserving- this fact needs to be taken into consideration.

The thesis seeks the answer for the following questions:

1. What resulted to the stock-increase of cervidae, and what are the reasons of it?
2. Can we talk about overpopulation in general among cervidae?
3. What kind of effect the stock-increase has on game farming and in the relationship of the stock of game and its habitat?
4. What are the chances of game farming to influence the proceedings, and are there any solutions can be used in practice?

The author believes that becoming acquainted with the proceedings has been passed is going to take us closer to those not or partly known conformities that affect them, and with the help of this knowkedge solutions can be successfully used in practice are going to be discovered.

The Methods in Force

The author has accomplished the examination in connection with the development of the stock of hind-, fallow, and roe-deer according to similar methods expanded in space and time. In this course, in each case of

breeds, the author came to the point of analyzing the proceedings first in Hungary, than in County Somogy, after a foreign outlook. Previous to the happenings of the recent past, the thesis shortly discussed the appearance of the given breed in earlier periods, and its spreading by using the data of stock number and spreading can be found. In the course of the examination the thesis pointed to the professional mistakes occurred in the practice of stock managing and previous strategic questions. Because of the unreliability of the stock-estimation data, author has made a stimulation model to examine the development of stocks in the past, in the case of all the three breeds. He tried to reconstruct the possible number of stock of the past decades by starting from the spreading data. At the quality examination of the stock of cervidae, usually the quality of the trophy is taken into consideration. For that the best conditions are given by using the formulas of trophy-judgement that are practised all over Europe. The author got informations about the developing of the quality of the trophies of the three breeds abroad from foreign specialist journal, and publications about scientific conferences. He accomplished the examination by analyzing the actual rank-list downloaded from the homepage of the National Trophy-Judgement Committee (OTBB). The author has examined the connections of changing the circumstances of the stock of game and its habitat, with special attention to the growing of the habitat of big games. In the course of the economic analyzing of game farming, the author was seeking the solution for the destructive effects caused by the changing of the stock-number, by analyzing receipts and expenses. In the course of analyzing receipts, he payed special attention to the

effects of the stock-number utilized by shooting-tenants, and the decline of prices, because of the oversupply. In the course of examining expenses, the thesis discusses the most problematic result of the overpopulation-the question of damages done by games in the forests and fields. After drawing the conclusion, the author presented a suggestion about changing the method of the planning of stock-managing, and stock-managing itself by the studying of the secondary parameters of the stock by the monitoring method.

Scientific results (thesis)

1. The author established that the main cause of the number-increase of the cervidae is the growth of the spreading area, which has several reasons. One of them is the advantageous change of the habitat, more specifically the growth of the forests and the biomass produced by the large-scale farming. The other reason is the effect of antropogeny, specifically the consious acclimatization of the breeds of game, the protection of the species settled down spontaneously, and the wrong stock-managing.

1.a This breed of game has better conformity to its environment, they pick up new habits, they do not insist on large, unbroken blocks of forest but they use habitat-complexes like the forest-field complex, or fields and other agricultural areas. This took a part of the expansion of the living area of cervidae.

1.b We can not talk about the overpopulation of hind-deer in general. The areas the number-increase has started from are clearly definable. This is where proceedings can be regulated. The balance between the stock of game and its forest and field environment is disturbed, and it causes a local crisis.

1.c The author established that for the growth of the spreading area of the fallow-deer, almost exclusively human intervention and the acclimatization is responsible. The overpopulation in the case of freehold-stocks can be localized only in a few areas.

1.d We can not talk about overpopulation among roe-deers because this breed has the ability to self-regulation which can prevent overpopulation in one certain habitat. In the same time it is proved that the roe-stock of Hungary is continuously under-utilized.

2. The author established that in most of the territories of County Somogy, next to the minimalization of the number and importance of small game there is an overkept hind and wild-boar stock, which is strongly overpopulated in the few affected areas. The same time presence of the four breeds resulted to the concentrated appearance of damages caused by games, from what the author concluded that the negative effects of the breeds on the farming environment are added up together. The density of

freehold game-stocks in County Somogy does not reach that level, where any recession would take place in any important parameter of the stock-like condition, state of health, ability of reproduction and trophy-products. It means that they do not use up the feeding stuffs offered by the habitat, that is why in this case we can not talk about the lack of game-supporting ability. The economic game tolerance of the forest and field environment has been strongly reduced, for that the stock that has been overpopulated in a few areas can cause significant damages. In the same time it is noticeable that the agriculturists, who has problems with producing too much, over react the damages done by games.

3. The author suggests on the basis of his examination to avoid intermittent intervention in the utilization of hind, because the wrong location and execution of these actions, and the deformation of the inner structure of the spread could result long-term changes in the structure of the stock. This kind of disadvantageous effect can be the sex-rate, the displacement of age-group relations, and in the consequence of this, the reduction of the quality of trophies and the largest attainable output, and the backwardness of the expected stock-reduction.
4. Actually the main problem of game farming is the industrial and productive type of functional model had been inherited from the past, in which the main respect is maximalizing the income from hunting.

Each area tries to keep as much game as they can to satisfy the needs of hunters, but under the current circumstances they can not finance the growth expenses of game keeping from hunting only. The defencelessness of game keepers against damages caused by games has strongly grown in the past ten years. Between the stroke of building the damage-preventing fences and the increase of the damages done by games in the agriculture, there is a very close relation (Correlation= 0,92234, $R^2=0,85071$). The significancy level of the Fisher's exact test $P<0,001$.

5. In the course of examining game farming from the economic point of view, it has been declared that receipts and expenses has grown considerably in the past ten years, but the increase of the expenses is larger than the income in the whole country, just like in County Somogy, for this game farming has become a losing venture. The profitability relations of game farming decline in spite of the fact that the number of the games had brought down is strongly increased. Between the spread and utilization of hunting of hind, the author has reported a close positive relation (Correlation=0,97610, $R^2=0,95277$). A relation just as strong as the previous one can be shown in the case of fallow-deer and roe-deer as well (Correlation=0,99407, $R^2=0,98818$). This can be explained with the disadvantageous situation of the market occurred because of the oversupply and the missing income.

6. According to the author's establishment the spreading of hind in the southern region of Transdanubia, in County Somogy is continuous, and from the ecologic point of view it can be called metapopulation because it is a population made up from other populations. Based on the resettlement of the part-populations and the dispersion of the puffer-zones, the continent-island model composed by STITH ET AL. (1996) can be put on the spreading of hind-deer in County Somogy. The areas that has large density of stock means the continent where from deer emigrated because of the extreme density or any other reason, and by doing that it established the part-populations called island by the model. The realtions to the original habitat still exist and the fact that in case the reason of the emigration is gone or reduced, is going to lead to a complete or partial remigration. From the development of the number of hind-deer in the past fifty years we can draw the conclusion that the overpopulation of the areas with large density had become permanent, that is why the frequency and intensity of the remigartion is reduced, and on the islands continously developing populations has established. The model of metapopulation can be compare to the hind-deer demographic land-use of FARAGÓ AND NÁHLIK (1992) since the central-temporary-periferial area arrangement can be put on the model of the island surrounds the continent. The central areas that has large density of stock - especially bare-game- are the continent. The inner island directly surrounding the continent are the

temporary areas, where a quite large stock of game can be found, but the number and density of these is far beyond the continents'.

6.a To develop a new stock-managing concept, I used the source-sink theory, which says that in case the new population established after emigration does not get supply from the base-population, than it is possibly going to crumble up. In the declining (reducing) period the population is not going to work according to the model diffused in regular density, but next to the constancy of the density measured in a certain part of habitat (central area or continent) the subpopulations' (periferial and temporary areas or islans) number is going to be reduced. Accordingly the problem of overpopulation needs to be solved in the central areas of cervidae because the number of the population can be reduced most effectively by putting the base-population that lives in the central area under the pressure of hunting.

6.b The author has introduced a possible solution to the problems of stock-managing by developing a condition-system of the regional (sub-district) game farming. The integrated stock-managing and farming in the sub-district means the simulatneous manipulation of the rates of big game breeds living in a certain habitat, compared to each other the age-group realtions, sex-rates, and the quantity and quality of them. The goal of this procedure is to develop a stock that various in species, suitable for long-term utilization, that lives in harmony with its

agricultural and forest environment, and smaller in its numbers, but better in its age-group relations, sex-rate, trophy quality and economic value.

7. The author has adopted the land-use theory to the fallow-deer.

7.a Accordingly I place those areas among the central areas where the number of bare-game is extremely high, where the population is older, and its most valuable pieces are being brought down in the period of the calling of does. The conditions of group-calling -that is a typical of fallow-deer- are developed in these areas. The calling lasts quite long, it is very active, and accompanied with aggressive fights that often cause the death of the harts. Other cause of death can be weakening as well. The backfight of bare-games is frequent because of the uncertain fertility.

7.b In the temporary areas there is a permanent stock of game, only the density is lot smaller than in the central areas. The calling is short and less intense because the fertilization is more certain among does, group-calling is almost never seen. Harts encore the group of bare-games is team.

7.c In the periferial areas bare games can only be found occasionally, therefore there is no calling or it lasts only for a few days, mostly with the participation of young harts squeezed out from the bigger calling places. Fertilization is certain. After the calling period young group of harts come

around this area.

7.d To reduce the overpopulated stock the stock managing model developed with the help of the metapopulation theory of continent-island can be used in case of this breed as well.

8. The author established from the analization of the yearly utilization data and the estimated stock numbers that in County Somogy in case of all three of deer species there is a significant underestimation from the side of game farmers, for decades. He attempted to reconstruct the stock-numbers retrospectively with the help of the simulation model of the development of stock-numbers in the past. On the basis of the calculations of the model it is probable that the real number was three times more than the estimated quantity, for a longer term. Between the calculated number of the model and the real spreading data I have found a close positive relation. (Correlation=0,83811, $R^2=0,70242$) The significancy level of the Fisher's exact test is $P<0,001$. In the case of the fallow-deer the difference between the calculated number and the estimated stock was more than 300% in 1990, however since the difference is getting smaller. The smallest difference was found in the case of roe-deer, the calculated quantity of the model is probably 130% of the estimated number.

9. On the basis of the suggestion of the author the

static planning based on the unreliable and manipulative stock estimation needs to be put on a new foundation. From the aspect of the planning of game farming, next to the primary data- number, sex-rate, age-division- it is necessary to have an information system that follows the status of the stock by monitoring. With the help of this method, the stock utilizing tasks can be defined for a whole year, or can be modified according to the results of the monitoring.

To the planning of stock utilization it is necessary to be familiar with the following informations:

- actual data of birth
- the condition and physical health of the stock
- natural and not natural loss
- rate of the progeny spent through the winter.

The forces of environment has different effects on each breed of game, that is why it has an influence on the data mentioned above. A significant yearly difference has great influence on the scale of utility of a stock.

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