

## *Continuing Education Article*

# Research Synopsis in Animal Sciences: What are the Expectations ?

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### ABSTRACT

In this paper proper format of the research synopsis is discussed for the guidance of the graduate students in the Faculty of Animal Husbandry, University of Agriculture, Faisalabad – Pakistan. Common mistakes committed by the students while submitting the synopsis and their solutions are also discussed. Suggestions are for the graduate students in the animal production disciplines. Nevertheless, these guidelines can be used for graduate students in Veterinary and Agricultural sciences.

**Key Words:** Research synopsis; Animal Sciences;

### INTRODUCTION

Synopsis is the plan of work or outline of the research proposal one intends to undertake. All the postgraduate students (M.Sc. and Ph.D) in the four disciplines of animal husbandry i.e. Animal Breeding and Genetics, Animal Nutrition, Livestock Management and Poultry Husbandry are required to submit their synopses before conducting research for thesis requirement of the degree. Synopsis is required to be submitted before or during the 3<sup>rd</sup> semester. A scrutiny committee, where all the four departments are represented, reviews the document and approves it before it can be forwarded to the Advanced Study and Research Board of the University before the conduct of research.

### FORMAT OF THE SYNOPSIS

The synopsis has a title, abstract, introduction (and objectives), review of literature, methodology and references. Format of each component of the synopsis is discussed in the following paragraphs.

**The topic and the title.** The first thing of a synopsis is its title. It is important because it is read before the actual project is read. It is also important that it is used for indexing the research. Choice of the topic is therefore the most important issue. As a developing country we are supposed to find practical solutions to the problems within the animal production discipline. The topic has to be within the boundaries of a discipline and issue should be important enough to spend time and resources. The supervisor's responsibility is, however, more than that of the student. The topic should be discussed in the research group and/or in the department before taking it up as research project. Supervisor should have topics with him within his research discipline and should take the student in confidence before finalizing it. Student's interest and interest of the research

group should both be watched. Generally the research topic should be confined within the discipline. Construction of research groups has helped a lot in confining the research projects within the specific discipline. This is also checked within the synopsis scrutiny committee because all the departments are represented in it and departmental interests are taken care of. Given our national circumstances and limited availability of the resources, problem oriented research should be given priority over the basic research. The research should address the farmers' needs. We must ask if the topic is the most important problem faced by the farmers/industry/institutional herds/country etc. Should a particular student accept the challenge to undertake it? (as the students vary in the capabilities to do one project as compared to the other). Can facilities (time, budget and equipments/ chemicals/ software/ animals/ data etc.) be provided/procured? Consultations among the student/ supervisor/ other committee members/research group etc can help improve the situation. Informal discussion forums can also be helpful.

After choosing a research project, it should be given a topic. The topic should be eye catching and focused on the major objective of the study. Generalization should be avoided. For example if research is conducted on commercial broilers, chicken should not be used to represent them. Similarly, if Sahiwal breed is being studied, generalization as if problem relates to cattle in general is not preferred. Topics such as 'Some aspects of ...' or 'Observations on ...' are also less attractive. One way of giving good phrase is writing various versions of the topic and then finalizing it with the help of supervisor and the supervisory committee. Usually less than 150 characters are recommended which means that at the most two lines of normal text.

**Abstract.** After the title, abstract is presented. It should be written after the synopsis has been finalised and should

usually start with the objective(s) of the study (without repeating the topic), followed by methodology and statistical design/technique. References are not allowed in the abstract except if it is a continuation of some previous work and there is no other choice to explain the things. Its length should be around 200 words. Use of abbreviations (except the standard ones) should be avoided. Name of the department, title of the synopsis, student's name (with registration number) and the abstract forms the first page of the synopsis document (as illustrated below).

# UNIVERSITY OF AGRICULTURE FAISALABAD

Department of Animal Breeding and Genetics

Synopsis for M.Sc (Hons.) Degree

## DEVELOPMENT OF MODELS TO STANDARDIZE LACTATION MILK YIELD UTILIZING SHORTER LACTATIONS IN SAHIWAL COWS

Imran Rafique Bajwa

94-ag-1601

### ABSTRACT

About 2500 weekly recorded lactations of Sahiwal cows

**Introduction/Importance.** Introduction starts with the importance of the project giving all the arguments for its justification as a research topic in the specific discipline. Previous work on the issue (or relevant work) should be mentioned. Review of literature should be presented in the form of an interesting story to the reader. Copying the abstracts of the research papers and pasting it in the review without one's own commentary does not create cohesion in the text. Therefore, it should be avoided. Students should read a lot on the subject and then write it in their own words before getting help from the supervisor.

**Objectives.** The objectives are given towards the end of the introduction. A separate subheading may also be used. Objectives are the questions being answered and are not just important by themselves, methodology depends on them.

**Review of literature.** Review of literature is the first thing to be done in the conduct of research after deciding the research topic. Review must be pertinent to the topic and should point out the achievements as well as deficiencies. All the members of scrutiny committee try to see this part but relevant departmental member mainly looks into it for suggesting any other reference missed or misinterpreted. Subheadings mostly help. Fifteen to twenty references are expected. It may be mentioned that the term '*et al.*' (actual is '*et alii*') is used a lot to refer to more than two scientists and means 'and others'. There can at least be two review styles. One, the more common one, is to say things chronologically (year wise). The second style is to tell the

story and fit/digest the references as they fit according to the segments of the story. This is not very common but is encouraged. Few examples are:

[The genetic correlation of mastitis and milk yield have been reported previously. Shook (1989) reviewed many studies and reported that mean genetic correlation of clinical mastitis and milk yield was 0.20. Weller et al. (1992) found the correlation of bacterial infection status with milk yield to be 0.22. A higher correlation (0.51) between mastitis and milk yield was also reported by Simianer and Knight (1991). Thus a slow but steady increase in mastitis incidence is expected to accompany genetic gain for milk yield.]

[Most estimates of genetic parameters available for buffalo populations involve small data from institutional herds and least squares estimation procedures (Tulloh and Holmes, 1992). Some recent studies have used BLUP procedures for the estimation of genetic and environmental (co)variances. Salah-ud-Din (1989) analyzed performance records of Nili-Ravi buffaloes from two military farms using mixed model methodology (Harvey, 1987). Milk yield had 6% heritability with repeatability of 41%. In Indian buffaloes, Raheja (1992a, 1992b) used REML procedures (ignoring relationships) to estimate genetic (co)variances. Estimates of heritability ranged from 0.21 to 0.28 with repeatability from 0.43 to 0.52 for the 1st three lactations. Pilla and Moili (1992) reported animal model evaluation of Italian buffaloes for milk yield for a standard lactation of 270-days. Heritability of milk yield was 0.28. For Nili-Ravi buffaloes, estimate for a standard lactation of 305-days was 0.18 as reported by Khan (1993).]

[Digestion of forage is also influenced by species, maturity, agronomic practices and morphology of forages (Cherney et al., 1993; Sarwar et al., 1995). Both the stage of forage maturity and N fertilization are important practices that affect yield and quality of forage (Reid et al., 1988). Juga et al. (1990) however, reported no difference in CP contents of N fertilized grass.]

[Adult body weight in chicken is not affected by sex-linked feathering genes (Al-Abdulatif, 1994; Buss et al., 1994). With respect to other traits, no significant effect of feathering genotype have been reported on sexual maturity (Hays and Spear, 1951; Dunnington and Siegel, 1986), egg production (Merat, 1967; Kotaiaht, 1989) and laying house mortality (Harris et al., 1984).]

**Materials and methods.** Theoretical and conceptual framework along with actual methodology in a research design is very important because it not just helps to best utilize the resources but puts limitations to the conclusions drawn. Methodology should be written such that if a debutante reads it, can repeat it.

**References.** References or bibliography section is the last part of a synopsis where all the references cited are listed. Every discipline has its own preference for journals which may differ in style from other journals in the allied disciplines. Follow the style most commonly employed or

preferred in your discipline but be consistent for each reference. Do not mix the styles of different journals. For example if year of publication is written as "2001.", do not mix with the style of "(2001)". Similarly, for page numbers, provide the complete range of pages instead of writing the first page only which may be Okay with some journals but having missed these at this stage might be troublesome if paper is to be published in a journal requiring the complete page numbers. To minimize errors, check all the references for authors at once, then see the year of publication for all references, title of articles, abbreviations of journals and then the page number and be consistent. For papers in other languages or published in journals not in English, do give the reference of the abstract as well. References should also be sorted in ascending order with a hanging indent at the beginning. Some examples are:

- Ahmad, Z., M. Khan, M. S. Khan and M. D. Ahmad. 1989. Effect of season on post-partum fertility parameters in Sahiwal cows. *Pak. J. Agric. Sci.* 26:118-124.
- Anonymous. 2000. Economic Survey (1999-2000). Government of Pakistan, Ministry of Finance, Islamabad. [<http://www.finance.gov.pk>]
- AOAC. 1990. Official Method of Analysis. 15<sup>th</sup> ed. Association of Official Analytical Chemists, Arlington, Virginia.
- Iqbal, J. 1996. Sire evaluation on partial lactation records in Sahiwal cattle and Nili-Ravi buffaloes. Ph. D. Thesis, Univ. Agric., Faisalabad.
- Khan, M. S. 1998. Animal model evaluation of Nili-Ravi buffaloes. Proc. 6th World Congr. Genet. Appl. Livest. Prod., Armidale, NSW, Australia (11-16 January, 1998). 24:467-470.
- Khan, M. S. and G. E. Shook. 1996. Effects of age on milk yield: Time trends and method of adjustment. *J. Dairy Sci.* 79:1057-1064.
- Khan, M. S., A. A. Asghar and R. E. McDowell. 1993. Adjustment of age at calving and lactation length for milk yield in buffaloes. *J. Dairy Sci.* 76(Suppl. 1):149.
- Minitab. 1991. Minitab Reference Manual. State College, Pennsylvania.
- National Research Council. 1989. Nutrient Requirements of Dairy Cattle. 6<sup>th</sup> rev. ed. Natl. Acad. Sci., Washington, DC.
- Snedecor, G. W. and W. C. Cochran. 1989. Statistical Methods. 8<sup>th</sup> ed. Iowa State University Press, Ames, Iowa.
- Steel, R.G.D. and J. H. Torrie. 1980. Principles and Procedures of Statistics: A Biometrical Approach. 2<sup>nd</sup> ed. McGraw-Hill Book Co., New York.
- Suzuki, M. 1976. The effects of parity and calving season in extension of part-lactation records based on field data. *Jpn. J. Zootech. Sci.* 47:632-641. (*Anim. Breed. Abstr.* 45:2693).

Abbreviations for some commonly used journals are given below for convenience. For more abbreviations first

issue of some recent Journal of Dairy Science or any other journal a discipline consults more often can be seen.

Acta Agric. Scand.	Anim. Behav.
Anim. Feed Sci. Technol.	Anim. Prod.
Anim. Reprod. Sci.	Asian-Aust. J. Anim. Sci.
Aust. J. Agric. Res.	Aust. J. Exp. Biol. Med. Sci.
Br. Poul. Sci.	Dairy Sci. Abstr.
Food Technol.	Indian J. Dairy Sci.
Int. J. Agric. Biol.	J. Anim. Plant Sci.
J. Anim. Breed. Genet.	J. Dairy Res.
J. Food Sci.	J. Range Manage.
J. Soc. Dairy Technol.	Livest. Prod. Sci.
Nature (Lond.)	Nutr. Abstr. Rev.
Pakistan Vet. J.	Poult. Sci.
Science (Washington, DC)	Theriogenology
Vet. Rec.	World Anim. Rev.

**Style.** Now a days 100% synopses are computer typed. One inch margin on all sides on a thesis paper with text spaced double line preferably using Times New Roman font (to save space) of size 12. Headings may be bold but pages should be numbered. You may or may not justify the right side but left side has to be justified.

## TIME LINE

Some experiments/projects might require that they are started earlier and the M.Sc.(Hons.) program should be time lined accordingly. A suggestion follows with respect to how can synopsis be submitted to be able to complete the whole program well in time. Time line to complete your M.Sc.(Hons.) program is given semester wise.

### First semester

- Try taking full load (15 credits) of the courses but concentrate on compulsory courses.
- Refine your interests within the department by meeting different teachers.
- The course work program should be submitted by the end of this semester.
- The allotment of supervisor should also be finalized before the course work program is submitted so that interests of the supervisor, student and the research group match and relevant courses can be decided.
- Check if special problem can be completed in this semester.

### Second semester

- Take full load of the course work program keeping in view the courses available in the next semester. Decide if compulsory deficiency courses need to be taken in the coming summer semester (if project need to be started earlier, summer vacations can be efficiently utilized).
- The topic and title of the project should be finalized with the supervisory committee in the start of this semester.
- Try to complete the review on the subject including the bibliography.
- Special problem should be completed in this semester if

it could not be done in the first semester.

### Third semester

- Course work should be completed in this semester.
- Synopsis should be submitted by the mid of this semester so that project is approved by the relevant authorities and experiment(s) can be started as early as possible.
- The review should be finalized and project should be started in this semester so that it may be completed in the start of next semester by maximum.
- Check with the supervisor if seminar (if enrolled) can be delivered.

### Fourth semester

- Data collection, statistical analysis and write up should be (has to be) completed.
- Present your seminar on your project (if it was not enrolled in the third semester) even if the partial results are available.
- Panel of examiners should have been submitted by the department to examination authorities around mid semester so that as soon as thesis is submitted, it can be evaluated by the external examiner.

## COMMON MISTAKES COMMITTED IN SYNOPSES AND THEIR SOLUTIONS

There are many problems with the synopses submitted. One of the many reasons for these shortcomings could be lack of any written document from where students can get guideline. Also, there is no technical writing course where students can learn to write a project proposal. They do however, learn to write technically through various assignments in their course work program. Most common problems encountered are presented here with suggestions/guidelines to improve them.

**Time for submission.** The first and the foremost problem is the timing of submission. Synopses are usually late. Many are submitted towards the end of the fourth semester even after research had been conducted. And if there are any flaws in the conduct of research, scrutiny committee is usually cursed for commenting on any of the item or it is expected to be the solution to all the problems and shortcomings of the research (to be or) already conducted. The fault may lie both with the student that he/she has been busy elsewhere, or with the supervisor who did not have time to guide the student or to find the researchable issue or he was allotted the student very late but rarely there is any genuine excuse. Whatever the case may be, if synopsis is not submitted in time, it is likely to create problems both for the student and the supervisor. Suggestions of the scrutiny committee become less useful after the conduct of research and it can only be discouraged.

**Lack of cohesion.** Lack of flow of the ideas is a more common problem encountered. One way to overcome it is to draw the outline first and then write the individual

segments so that when the reader is finishing the first paragraph, he should expect what should come in the next paragraph or at least he/she is not surprised while starting the next paragraph and so on.

**Unfocused research objectives.** Lack of specificity is another problem. Focus on the topic and do not get into generalities such as 'Pakistan is an agricultural country ...' or 'Livestock play pivotal role ...' or 'Per capita protein availability in Pakistan ...'. Start with the specific issue. For example:

1. *Age at first calving in Nili-Ravi buffaloes ...*
2. *Cholesterol contents of eggs can be reduced ...*
3. *Despite various well recognized roles played by camel*
4. *Heat stressed animals undergo changes like ...*
5. *Medium-chain triglycerides and L-carnitine have been researched ...*
6. *Nested mating designs are traditionally used to estimate ...*
7. *Nitrogen enriched corn cobs have a limited ...*
8. *Parasite infection is a major constraint on sheep production ...*
9. *Quantification of tick effects is required for a planned strategic control ...*
10. *The Booroola fecundity locus in sheep ...*

Some examples of less focused objectives are:

1. *To increase the income of the farmers*
2. *To make the country self-sufficient in quality mutton ...*
3. *To improve the performance of native birds through breeding*
4. *To determine egg production potential of desi chicken*
5. *To generate basic information about amino acid profile, solubility and degradability of some feed resources which will help in cost effective formulation regarding protein quality for non-ruminants and by-pass protein for fast growing and high producer dairy animals.*

First four are examples of vague objectives. They can never be achieved and successful conduct of research is very difficult to judge on them. Sometimes people try to say every thing in the objective/objectives (the 5<sup>th</sup> objective above). It implies many things. 'basic information' as if it has never been done before 'some feed resources', one ? two? and which one? and superfluous part of the sentence 'which will help ...', should have been given in the introduction/importance and is out of place here.

Good examples of concise and clear cut objectives are:

1. *Estimate prediction accuracy of different milk yield adjustment procedure for lactation length in Nili-Ravi buffaloes.*
2. *To compare feed efficiency and egg quality of molted WLH and LSB layers in their third production cycle.*
3. *To study the role of nutritional factors in seasonality of reproduction in buffaloes.*
4. *To determine the influence of stage of maturity on digestibility of DM and fiber components.*
5. *To determine the energy balance from carbon and nitrogen balances in RIR hens fed corn-based diets.*

**Plagiarism.** Plagiarism is an important issue. Work of others can not be used without a proper reference to their name(s). In case a sentence or sentences are to be used as such, inverted commas should be used before and after. So proper rephrasing is required. The work of the other scientists should be acknowledged generously. One way to improve the student's understanding of the subject is ask him to review the topic, some basics can be corrected there. Then the introduction should be taken up. This also helps the student to get exposed to the literature and will also help to finalize the methodology. Supervisor must sit with the student after the first draft for coaching. Repeated printing rarely helps to improve the quality.

**Irrelevant references in the review of literature.** The common mistake/problem is irrelevance of references presented in the review. Cutting and pasting with the help of a word processor has made it even worse. Although, improvement in library facilities with the developments in information technology was expected to improve the situation, it seems deteriorating. Common sense must prevail and this can be taught in the courses where in-class presentation/submission of assignments is required. Subject must be reviewed before synopsis is written and experiment is started.

**Common errors in the materials and methods.** The most common error in the methodology is delusion and sometime ignorance of statistical techniques that need to be used for optimum use of experimental materials and techniques and analyze information to make it presentable where results can be compared and conclusions can be drawn. Availability of homogeneous material (for example, the day old chicks in poultry experiments, due to mixing of substandard chicks with good ones) is a major problem in poultry nutrition experiments. In such cases, waiting for the first week to reject those that were quite a bit above or below the mean would be a choice for employing Completely Randomized Design but it is rarely practised.

It may also be mentioned that there is a general lack of understanding of the basic philosophy of experimental designs. Appreciation that randomization is a must to collect unbiased results is sometimes lacking. Even the basic idea that only replication of treatments can help test the means is sometimes missing as well. Taking random samples, mixing them and then taking two or three samples (to cover the laboratory flaws) does not replace replication. It is likely to kill the variance and will result in significant differences

among means. So understanding of what is an experimental unit and choice of the statistical technique is the core issue of methodology and must be discussed before the start of the experiment. In case of doubts, more than one experts may be consulted on this. A suggestion is that do not blindly follow an old experiment or thesis. It may also be wrong. Sometimes over ambitious experiments are also encountered where three or even four way interactions are being employed. A second thought is needed in such situations as it is likely to make it very difficult to discuss and interpret the results in such situations.

Sometimes there seems confusion in the procedure to separate means. When there is control in the experiment, it is assumed that all other treatments will be compared with it and comparison among them is not intended, so Fisher's Least Significant Difference (LSD) test can be used but if comparison is intended among all the treatments, Duncan's Multiple Range (DMR) test may be used. Of course other tests can be employed as well depending on the situation.

## RECAP

The final shape of the thesis depends on the outline for the conduct of research. Thesis should be considered as the product/creation of the student. The student should thus strive hard to make it presentable. Of course it is developed under the supervision of the supervisor and other members are consulted to improve it. The supervisor must provide the opportunity to the student to go through the thinking process of research, where hypotheses are formulated, accepted or rejected, reformulated, refined and re-tested and new knowledge develops, not just the conduct of it. Environment should be created where the student can provide himself with a working hypothesis, works to get enough facts to prove or disprove it, owns it, defends it and feels proud of it. This must prepare him to be able to indulge himself in such an activity as and when an opportunity arrives in his future career. Lets get together and improve the situation as students, teachers/researchers/supervisors and the members of supervisory or scrutiny committees. It is doable.

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