

SOCIAL COMBAT: HOMOLOGY IN MOUNTAIN SHEEP DOMINANCE FIGHTING AND CONTROVERSY IN WILDLIFE MANAGEMENT

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Abstract: Social combat among mountain sheep rams during pre-rut activities appears to focus on the quest for immediate reproductive success. However, deeper thinking suggests its significance is control of the future through the selective mechanisms which define inclusive fitness. Homologous clashes occur in contemporary wildlife management at all levels ranging from regulatory proposal deliberation backward through operational and strategic management planning to research project development. Just as in social combat among rams, the apparent prize appears to be short-term; but the more significant issue is control of the future. Discussion of inclusive fitness mechanisms in mountain sheep and African lions and observations from contemporary wildlife management demonstrate that viewing management conflicts in the framework of inclusive fitness may simplify management by decreasing social combat.

Social combat among mountain sheep has a *functional* as well as an *adaptive* application. The *functional* aspect is determination of dominance rank (Geist 1968, 1971). Access to reproductive privilege accompanies dominance rank. Hence, dominance fights appear to be over immediate mating success.

Contemporary understanding suggests the *adaptive* aspect of social combat among rams is served through the classic evolutionary axiom, "survival of the fittest." Because reproductive privilege attends high dominance status, the "fittest" ram is the dominant sire of the most lambs. Through contemporary convention, "survival of the fittest" has been replaced by the more modern concept, "inclusive fitness". By extension, social combat may be seen as a contest for future genetic control of the population or species. That is, the most competent dominance fighter will attain the highest status and leave the most offspring, thus affecting the future of the species to a greater degree than his less successful competitors.

I suggest social combat in wildlife management also has both *functional* and *adaptive* roles. In this paper, I shall discuss the similarities in structure and function of social combat in mountain sheep rams and wildlife management. I shall also borrow from the behavior of African lions. Finally, adaptive strategies suited to the changing social environment in wildlife management today will be discussed in terms of Geist's (1976) Dispersal Theory for wild sheep.

METHODS

Social dominance fighting among mountain sheep was first interpreted by Geist (1968, 1971). I have observed and experienced social combat in the wildlife management profession since 1971.

Infanticide among African lions with respect to inclusive fitness has been identified and discussed by Schaller (1972) and Bertram (1975, 1976). These authors offered evidence that when a new lion takes over a pride, the existing cubs are killed to initiate a new estrous cycle. Through this mechanism, the dominant male gains control of the "genetic future" of the pride. Parallel functional effects have been observed in populations of human wildlife managers since 1971.

Social combat among scientists has been described by Geist (pers. comm.) in functional terms related to attaining social status. I am unaware that the adaptive significance of this behavior has been identified. I have observed and been involved in social combat among wildlife scientists at levels analogous to ram classes I through IV (Geist 1968) since 1971.

Geist's (1976) dispersal theory offers an environmentally driven rationale for variations in frequency and intensity of social combat among mountain

sheep rams. This theory of habitat-driven phenotypic selection postulates that as environments mature, selective pressures confer fitness advantages on differing combat intensities. Homologous changes in the wildlife management environment have been observed from 1971 to the present.

RESULTS

Social dominance fighting

Among mountain sheep rams, social combat consists of delivering maximum clash force through head-to-head contact followed by horn display. The ram delivering the greater clash force attains dominance status. With dominance status comes reproductive privilege and increased "genetic" control of the future.

Social combat in wildlife management is homologous to that in sheep. It consists of delivering clash force in head-to-head confrontation with those of differing opinions. For both rams and wildlife managers, clash force is the operative definer of success. For rams, the physics of clashing are straightforward. Momentum, which determines effective clash force, is the product of body mass times velocity at impact. Velocity is a function of acceleration resulting from tactical position and individual ram effort. In the wildlife management homologue, the physics require more interpretation. Mass may be seen as a function of the "weight" of scientific and public opinions, and its multiplier, velocity, as a function of the accelerating forces directing these opinions.

Past conservation success may be considered the *adaptive* manifestation of *functional* social combat between managers and the publics they serve. The prevailing individual, side, or interest group established control of the immediate future of management through more skillful generation (and application) of momentum than did their competitors. As a result, the *functional* winners are in control of the present, which should (if dominance can be maintained) facilitate *adaptive* control of the future.

In sheep habitats, beneficial adaptations are defined by geography, (which is relatively stable) and weather (which is highly variable). In the political environment of wildlife management, beneficial adaptations are defined by law (the stable analogue of geography) and public opinion (the fickle analogue of weather).

Infanticide among African lions

In African lions, control of the genetic future is appropriated by dominant male lions through extirpating descendants of the deposed dominant male. Loss of cubs initiates a new estrous cycle and assures repro-

ductive success (genetic control of the future) for the new dominant. It should be noted that the new dominant directly controls the genetic future only as long as he remains in control of the pride.

Homologous behavior among wildlife managers is most clearly identifiable at the higher levels of wildlife management bureaucracies. At this level, changes of administration typically result in "mortality" among the descendants of the previous administration. In management bureaucracies, the politically maladapted descendants are not literally killed, but neutralized by moving them out of positions of influence as the new administration moves to solidify its control of the immediate future.

Social Combat among wildlife managers

Geist (pers comm.) has compared ritualized dominance fighting among wildlife scientists to mountain sheep rams. The venue for this combat is most often the seminar or symposium, although it may occur in published literature. Typically a subdominant biologist initiates the conflict by challenging an established dominant on a fine point of data analysis or interpretation. If successful in his/her challenge, the subdominant gains social status. Because this social status usually affects management situations only indirectly, its significance is *functional* rather than *adaptive* in the longer run unless the status attained results in beneficial management changes.

In applied management, dominance fighting usually occurs when lower ranking biologists advance new concepts or attack established scientific or agency paradigms. It is my observation that, among wildlife managers, this combat is also focused more frequently on *functional* than *adaptive* outcome. This represents a change in selective pressures of the management environment.

Geist's Dispersal Theory

Geist's theory of phenotypic selection postulates that as glaciers receded, emerging sheep habitats were colonized by dispersal phenotype rams. These rams exploited the abundant pulse-stabilized resources to express an aggressive, robust, risk-taking behavioral strategy suited to the unexploited habitats associated with glacial retreat. As habitats matured and supported higher sheep population densities, the Dispersal Theory postulated a shift in fitness advantage away from the combative dispersal phenotype to more conservative rams (the maintenance phenotype). Maintenance phenotypes are better adapted to group selection through hierarchical mechanics than the individual selection which favored dispersal phenotypes in more primitive environments.

The social environment (the homologue of habitat) in which wildlife management operates is similar in both structure and function. Unexploited "management habitats" have historically selected for "dispersal phenotype managers." As in mountain sheep, these managers have been aggressive risk-takers who rapidly adapted to the new environment by taking individual risks through innovation and personal 'chutzpah.' As the management environment matured, greater constraints developed, and selection for maintenance phenotype managers prevailed. Maintenance phenotype managers function better at the group level than their dispersal phenotype ancestors. In "maintenance habitats," display to maintain hierarchical position appears to have supplanted combat in dominance determination.

Here I should note that the Dispersal Theory emphasizes phenotypic selection. This is important because the issue centers on what the management environment favors, not on the inherent (genetic) quality of any individual.

DISCUSSION

Social dominance fighting

Conflicts, whether between individual rams or differing management perspectives, too often focus on *functional* 'individual' benefit (simple maintenance of dominance status). This focus is obvious when conflict is between individual managers, but less so when combat involves special interest groups or agencies. Still, the principle and outcome are the same. *Functional* considerations appear to override *adaptive* decisions. When this happens, an individual or group interest should be understood as seeking its 'individual' benefit. The *adaptive* significance of the *functional* aspirations in these combat situations may or may not be well defined.

In the less structured management environments (favoring dispersal phenotype managers) maximizing 'individual' benefit appeared less frequent than at present. I think managers used to be more focused on the adaptive significance of management decisions. Put another way, the dispersal phenotype managers appeared more interested in what they considered beneficial management than in personal status.

In developing management environments (which I equate with bureaucratic 'newness'), selection favored dispersal phenotype behaviors. Under these conditions, challenges by individuals were welcomed, even cultured. Progress was expected to result from confrontation. Combat mechanics were primal, delivery of superior clash force decided each ritualized encounter. Hence, if the challenger were to prevail, he (in

those long lost days before female managers) had to generate superior clash force (momentum) using the 'mass' of biological data or management principles accelerated by personal effort. As in mountain sheep, the ritualized nature of combat precluded personal involvement which tended to focus more on the *adaptive* aspect of the conflict.

In management environments favoring maintenance phenotypes (which I equate to bureaucratic maturity) the social habitat no longer favors dispersal type behaviors, and individual challenges become risky business. In maintenance-selecting environments, the dominance hierarchy is much more rigid and personalized. Consequently, challenges by subordinates are interpreted as attempts to gain individual status by deposing existing social dominants rather than suggestions for long-term strategic improvement. Under these circumstances, it is natural for dominants to make maintaining the established hierarchy (and their place in it) the priority. That is, emphasis centers on the *functional* aspect of combat (the immediate need to preserve dominance rank) instead of the potential *adaptive* significance of the challenge.

If subdominants see their challenge as altruistically *adaptive* rather than personally *functional*, it is logical to expect them to identify and champion alternatives. When the converse is the case, personal risk of losing status becomes too great to justify challenge. In this environment, the obvious alternate "reproductive strategy" is to assume a subdominant position in the hierarchy, and hope to influence the future after rising to dominance status. Status is achieved by avoiding conflict and currying favor with dominants through submission. Alternately, the subdominant may abandon the fight altogether, and leave the agency, or pursue other 'reproductive strategies' by carrying the fight to the public arena as bighorn sheep management iconoclast, James K. Morgan, did two decades ago. Other alternatives, such as working covertly with the public while remaining within the agency are possible, but demand a high level of personal altruism.

With increasing frequency, the dominance hierarchy of contemporary maintenance-selective management environments cedes *adaptive* behavior (control of the future) to a subset of dominants called planners. Planning is a specialized discipline which, as a consequence of its specialty, focuses increasingly on process and broad social acceptability. Individual combat involving planners appears to be limited to intra-agency venues, and is generally decided through mechanisms that can function only in a maintenance management environment. Attaining dominance among planners is accomplished almost exclusively by display, with clash force being virtually obsolete. Limit-

ing classic social combat in pursuit of group consensus characterizes contemporary planning methodology. Actual combat is deferred to legal venues (and to other combatants) at plan implementation.

To succeed in this system, 'dispersal-type' managers attempting to influence the future will have to work through the dominance hierarchy of planners and administrators. Hence, the 'physics' of combat must be modified. In the 'maintenance environment,' success requires generating momentum using the 'mass' (of biological or management principle) accelerated by group consensus rather than individual effort. Greater momentum may result, but accelerating the mass is slow and complex work. The key to success in this system comes through presentation of material in a submissive (not confrontational) behavioral context.

In this context, conflict which develops within the planning team or at plan implementation should be carefully analyzed by the involved agency. Before entering into conflict in a maintenance environment where specific challenge may be maladaptive, it is critical for the management group to identify whether success in social combat will serve a *functional* or *adaptive* purpose. Is agency interest in preservation of dominance status (which should not be relinquished without adaptive yields) or in effecting long-range conservation? After all, the fundamental difference between the behavior of humans and sheep or African lions has its basis in the cognizance that present choices affect future events.

It is presumed that humans understand the future better than sheep and lions. Today's 'animal rights' movement notwithstanding, the days when animals managed humans by direct predation and superstitious human belief in the power of animal spirits, appear to be behind us. Now "we" are expected to manage "them." Without evidence that mountain sheep and African lions consciously elect to maximize their inclusive fitness through social combat, our inclusive fitness construct defines the first level of adaptive significance in terms of individual benefit.

Wildlife managers should guard against the natural confusion of individual (or agency) benefit with the *raison de'etre* of wildlife management. If we grasp the existence of 'future,' we are responsible to and for it. The historic essence of wildlife management is to provide wildlife for future human use established by legal mandates which define the *adaptive* benefit of wildlife management actions. This is an inherently altruistic enterprise because we as individuals forego immediate wildlife-related benefits to enhance future benefit opportunities for ourselves and our progeny.

Expressed another way, when we protect and manage habitats or observe closed seasons and bag limits (so there will be an abundance of wildlife for our use during harvest season, or in the long term future), our overarching goal is wildlife conservation. Hence our success as wildlife managers will be judged by those for whom our "future" becomes their "present."

I suggest that if each decision regarding combat in wildlife management (whether the issue is research or management direction, or public acceptance of management plans and regulations) were driven primarily by its *adaptive* significance rather than its *functional* utility, management success would increase. Furthermore, I suggest the legal environment (defined by constitutional and legal mandates) should define long-term "adaptations" which are best appropriated by managers. This, of course, assumes that laws reflect the will of the 'common property' (i.e. wildlife) owners. If this is not the case, managers are still constrained to function within the adaptive parameters defined by law. Should this be objectionable to the public, it is the public's responsibility to change the legal environment. I think it maladaptive for managers to conform to perceived public opinion instead of law. Ignoring established (codified) selective mechanisms, while it may confer a short-term reproductive advantage (such as a larger budget) as a response to "weather" rather than "geography," is unlikely to provide a long-term *adaptive* benefit.

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