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# The "BIG FIVE" – A South African perspective on sustainable holistic internal parasite management in sheep and goats☆

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ABSTRACT

Because we became an unintended world leader in the development of multiple anthelmintic resistance, South Africa has had to find, embrace and implement more sustainable and holistic methods of managing helminths in sheep. The problem has been to wean farmers off a heavy reliance on anthelmintics and to use a wide array of measures that require more management, in the face of inertia and attempts by some unscrupulous drug purveyors to block the needed changes. Packaging the available and proven measures into five practical sections helps to make the change more palatable and attractive to farmers. These sections are termed "The Big Five" and consist of firstly, host resistance and resilience: in the past we have concentrated too much on anthelmintic resistance (AR) and not enough on SR (sheep resistance). The motto must be "Stop Selecting Sissy Sheep!" To achieve this we can apply selection of rams by faecal egg counts (FEC) or FAMACHA, culling of ewes based on targeted selective treatment (TST) results, good nutrition, especially protein and trace elements needed to support immunity, enough exposure to worms for immunity to develop, and control of other diseases. Secondly, reducing parasite load: since the outcome of parasitosis is largely determined by numbers, this needs ongoing attention. This can be achieved by reducing the length of stay in a pasture, reducing the grazing pressure if this is not possible, increasing the time of absence from a pasture, especially at danger times, alternation with non-susceptible grazing species where possible, avoiding worm "hot spots" like grassed pens and leaking water troughs. Thirdly, evaluate pasture factors: the farmer and advisor have to consider the height (length) of grazing as it affects its risk for parasite transfer, the type (pasture species) as it will influence risk, the pasture slope affecting run-off and thus the suitability for larval survival, and the aspect (direction facing) should also be used to assess risk. Fourth, monitoring the situation: farm situations can be assessed by regular (monthly or bimonthly) pooled flock FECs, AR assessments using FEC reduction tests (FECRTs) or other measures, measures using TST like the 5 POINT CHECK, a weather watch to predict conditions favourable for larval development (rain, humidity, temperature) and grazing monitoring to assess developing dangers. Fifth, optimise drugs to be used: drug usage must be rationalised and minimised. Implement TST and TT (targeted treatment); read the label, follow instructions and check the spectrum covered; weigh the sheep, set dose according to the heaviest in the group and check the gun for accuracy and repeatability; target the most vulnerable (lambs and lactating or heavily pregnant ewes) for special attention; do not buy on cost alone and do not formulate (mix) own farm mixtures. By emphasising the "Big Five" we can encourage and enable farmers to implement four or more items in each section, and thus minimise the long-term effects of internal

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parasites on farm profitability. This approach has assisted with getting farmers to use sustainable, holistic internal parasite management (SHIPM) in sheep flocks. A reminder in the form of a poster to be hung on the wall of the farm office will help encourage continuous implementation.



## 1. Introduction

This contribution is based on findings and observations applicable to South Africa. As a regional perspective on what is being applied regarding internal parasite management it is impossible to back all statements and opinions with references to published scientific reports or articles. However the observations represent an overview of current successes, problems, findings and developments that characterise this region.

It is widely acknowledged that relying largely or completely on drugs to control helminths is dangerous and unsustainable in the long term (Martin, 1985; Barger, 1999; Bird et al., 2001; van Wyk et al., 2002; Besier and Love, 2003). Yet overreliance has led to multiple anthelmintic resistance (MAR) world-wide (Le Jambre, 1978; Papadopoulos, 2008). Because South Africa became an unintended world leader in the development of MAR, it has had to find, embrace and implement more sustainable and holistic methods of managing helminths in sheep. The emphasis has been on long term, practical and cheap solutions that are integrated with one another. Management is the goal, not unachievable eradication or elimination (Waller, 1999; Bath et al., 2001; Anonymous, 2002; Bath, 2006; Jackson et al., 2009).

There will always be those farmers and even their advisors who ignore all warnings, advice and evidence, and will continue to practice unsustainable measures until they fail. These farmers will eventually be forced into a corner where there are no longer any easy options, and they will either at last listen to advice, or abandon small ruminant farming. The latter may well happen with the blame being placed on the animals rather than with the farmer or advisors.

The problem has been to wean farmers off a heavy reliance on anthelmintics and to use a wide array of measures that require more management and planning, in the face of inertia and attempts by some unscrupulous drug purveyors to block the needed changes (Bath, 2006). It must be conceded that accepting the need for change is difficult and a combined long term effort shared by advisors and pharmaceutical firms is needed. The pharmaceutical industry is powerful, therefore an antagonistic stance would be unproductive and bound to fail. By combining forces on an agreed set of principles that safeguard the financial security of this industry, a successful outcome is far more likely.

Sustainability must be a key issue, yet is often ignored in the quest for quick answers in the short term. It is uncontestable that integrated and sustainable control is inherently more difficult than a reliance on drugs, but because something is difficult it does not mean that it is either unattainable or not worth trying to achieve.

Holism is a concept coined by the South African soldier, statesman and philosopher Jan Christiaan Smuts (1870–1950) in his book "Holism and Evolution" (1926). The original meaning has been blurred and changed, it is advisable it to revert to some of its original intentions. Currently holism has become a vague term connoting an all-embracing, rather non-scientific concept, used enthusiastically but wrongly by new age and alternative lifestyle proponents. For Smuts, holism meant "the tendency in nature to form wholes that are greater than the sum of the parts through creative evolution" and it is in this sense that the term is used in this paper.

Fortunately, there are many well tested and confirmed methods other than drug administration that control the impact of helminth parasitism (Michel, 1985; Bath et al., 1996; Bisset and Morris, 1996; Barger, 1999; Bath and van Wyk, 2009; Kenyon et al., 2009), and there is no need for further extensive research before this knowledge can be implemented. However, as pointed out many times before (van Wyk et al., 2002; Besier and Love, 2003; Anonymous, 2002; Bath, 2006; Jackson et al., 2009), the problem has always been in getting most farmers to accept the changes necessary, and to implement most of the aspects that constitute holistic, integrated and sustainable parasite management.

This reluctance to change and implement new methods is at least in part due to the large number of points that have to be remembered, considered and put to use in an orderly way. Depending on what is counted and subdivisions, this number can total 25–40 items – little wonder then that well-meaning attempts usually fail. However, by packaging the points into five major groups of 5 (or more) items each, the problem is much more manageable and liable to be implemented. The five groups of like or related items help concentrate attention on the most important factors that determine success in managing internal parasitism in sheep and goats. This approach has been given the name "The Big Five" although of course it has no further connection with the African wildlife Big Five from which it derives.

## 2. The Big Five: a new approach

Instead of starting with drugs, this systematic approach ends at this point – not because drugs are of little value or can be eliminated, but rather because their importance has been over-emphasised to the detriment of other important factors (van Wyk and van Schalkwyk, 1990; van Wyk, 2001; Waghorn et al., 2008, 2009). We therefore start with all the factors that promote resistance and resilience against parasites in animals, then deal with the factors that reduce the parasite load, thereafter the pasture characteristics to be noted and used, following this practical ways of monitoring the situation, and finally correct drug use. Packaging the available and proven measures into five practical sections helps to make the change more palatable and attractive to farmers.