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MICRON PREMIUMS AND THEIR ROLE IN MERINO BREEDING PROGRAMS

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SUMMARY

Micron premiums (MP) are an appropriate means of incorporating drivers of the value of fine wool into Merino breeding programs. Changes in the relative value of wool to meat since 2003 resulted in significant changes in Merino breeding objectives and the demographics of the Australian sheep flock. Over the same period, the average MP for fine wool (< 19 microns) have been greater than 10% regardless of the variation in the Eastern Market Indicator and an increased proportion of fine wool in the Australian clip. However, due to high heritability of fibre diameter (FD) MERINOSELECT indexes are adjusted to reflect a reduced MP to produce more balanced indexes. While individual Merino breeders can increase the emphasis they place on FD when making ram selection and purchase decisions, MPs are not routinely reported making it problematic for Merino breeders to balance the value of focussing on genetic gain in FD and the suitability of MERINOSELECT indexes in meeting their flock's breeding objective.

INTRODUCTION

Micron premiums (MP), defined as the percentage increase in price per kg for a reduction of one micron, are a measure value of changing fibre diameter (FD) relative to fleece weight (FW) (e.g. the 19 MP is the difference between the price of 19 µm and 20 µm wool, divided by the price of 19 µm wool, expressed as a percentage). Expressing MP as a percentage provides a constant relative value over time, irrespective of the absolute price. MPs provide Merino breeders with the means to link the market value for wool with the breeding objective and selection emphasis used in their breeding programs. Due to the economically unfavourable genetic correlation (0.3) between FD and FW (Safari *et al.* 2005), Merino breeding objectives using MPs were based on a desired gains approach and generally ranged between 3 to 20% with simultaneous improvement in FD and FW possible within this range (Swan *et al.* 2007). Producers wishing to place emphasis on increasing FW while maintaining FD would use a 3% MP, those wishing to reduce FD and maintain FW would use a 15% MP. Producers placing an equal emphasis on FW and FD would use a MP midway of that range. MP-based breeding objectives were routinely used in within- and across-flock selection for Merinos up to the early 2000s. However significant changes have occurred in the landscape for Merino wool production enterprises driven by variation in the relative value of meat to wool with consequent changes in the demographic structure of the flock. As a result, the contribution of FD to Merino breeding objectives began to decline (Swan *et al.* 2017). This paper explores the value of MPs over the past 20 years together with changes in the fibre diameter composition of the Australian wool clip to ascertain the importance of MPs in 'modern' breeding objectives for Merino sheep.

THE CHANGING LANDSCAPE OF MERINO PRODUCTION

Changing demographic of the Australian sheep flock. In 2003 income from the sale of wool

* A joint venture of NSW Department of Primary Industries and Regional Development and the University of New England

comprised 66.0% of the total receipts for specialist Australian sheep producers, however by 2022 this had reduced to just 38.0%, with income from sheep sales comprising 61.9% of total receipts (ABARES 2024). Higher meat prices have led to wethers being sold as younger animals into the lamb or store sheep market rather than retained for wool production. In 2003, 43.7% of total Australian sheep numbers were ewes (ABS 2004) by 2023 this had increased to 58.6% (MLA 2023). In addition, large numbers of Merino ewes are now mated to rams from meat breeds to generate progeny with high value lamb carcases (Swan *et al.* 2007).

Evolution of Merino breeding objectives. Significant changes have occurred in Australian Merino breeding enterprises over the past 20 years. Up to the early 2000s, FD was the dominant trait in the Merino Production Plus (MPP) index, however this began to change from 2005 when the influence of yearling bodyweight (YWT) began to increase (Swan *et al.* 2017). From 2010, the emphasis on clean FW and YWT increased substantially with FD making a small negative contribution, due to a positive trend in the trait (Swan *et al.* 2017). The relative economic contribution of FD to the current wool focussed MERINOSELECT indexes is 21 and 17% for the Fine Wool (75:25 wool to meat income ratio) and Wool Production (71:29) indexes respectively (MLA 2024). There has also been a recent industry directive for all MERINOSELECT indexes to target animal welfare, in particular reducing breech wrinkle (MLA 2024), which has unfavourable genetic correlations with FD (Hatcher and Preston 2018).

MICRON PREMIUMS SINCE 2003

MPs for fine (17, 18 & 19 micron) and medium (20, 21 and 22 micron) Merino fleece wool were calculated from the daily micron price guides (MPGs, average of the Northern and Southern selling centres) reported by the Australian Wool Exchange (AWEX) in their National Market reports from the 1 July 2003 to the 26 June 2024 (Table 1) representing the past 20 wool selling seasons. The data was also spilt into the past 10 and past 5 selling seasons. Over the past 20 wool selling seasons the 17MP, 18MP and 19MP averaged 11.7, 11.1 and 10.4% respectively. The average of the medium wool MPs (20MP, 21MP and 22MP) were about a third to a quarter the size of the fine wool MPs.

Table 1. Average and range of MP for fine and medium Merino fleece wool for the past 20 (from 2003/04), 10 (from 2013/14) and 5 (from 2019/20) wool selling seasons to 2023/24

MP	Past 20 seasons *2003/24 to 2023/24*			Past 10 seasons *2013/14 to 2023/24*			Past 5 seasons *2019/20 to 2023/24*		
	Ave	Min	Max	Ave	Min	Max	Ave	Min	Max
17	11.7	0.5	73.4	9.8	0.5	28.9	15.5	0.7	28.9
18	11.1	-5.9	31.6	10.5	1.6	28.8	14.9	2.2	28.8
19	10.4	-0.7	37.1	8.0	-0.4	26.4	11.1	-0.4	26.4
20	3.9	-1.0	12.7	3.0	-0.9	10.4	4.1	-0.2	10.4
21	2.8	-7.6	10.8	2.0	-7.6	10.8	2.4	-2.0	10.8
22	2.7	-3.3	13.8	1.7	-3.3	10.3	3.9	1.4	9.2

MPs were reasonably consistent despite significant variation in the overall market level of Australian wool (Eastern Market Indicator, EMI) sold at auction (Figure 1) and increases in the weight of fine (17.5 and 18.5 µm) wool tested (a proxy for wool production) since 2003/04 (Figure 2). This highlights the consistent high value placed upon fine wool by the global wool trade, regardless of the overall level of the Australian market and volume of fine wool.

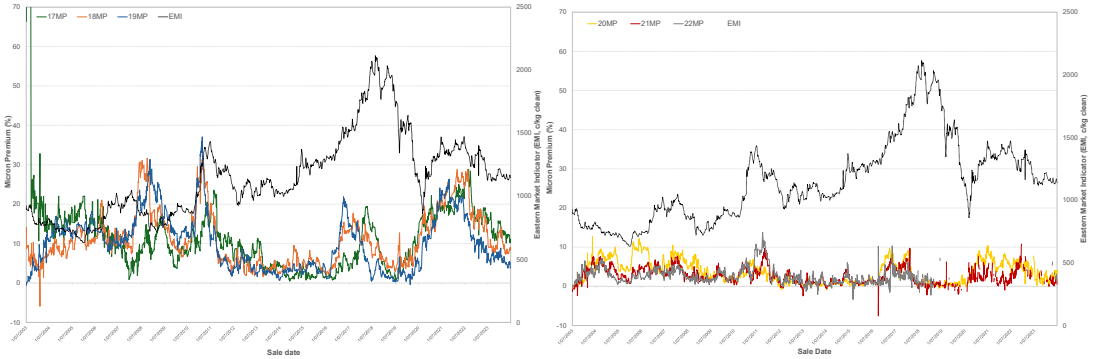

Figure 1. Variation in a) fine and b) medium wool MPs over the past 20 wool selling seasons compared with the Eastern Market Indicator (EMI, c/kg clean) wool.

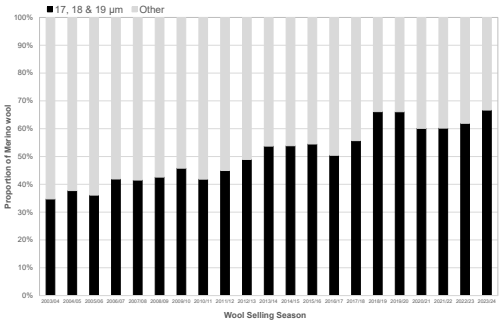

Figure 2. Variation in the weight of fine (≤ 19.5 µm) wool relative to broader Merino wool tested (AWTA Key Test Data) over the past 20 wool selling seasons (Source: AWTA Analytics. Accessed 29 September 2024).

HOW ARE MPS ACCOMODATED IN MERINOSELECT INDEXES?

The standard MERINOSELECT indexes were designed for four general production systems that cover the broad range of breeding directions used in the Merino industry (MLA 2024). These range from those strongly focussed on reducing fibre diameter (Fine Wool) to those with a strong focus on increasing wool production (Wool Production) along with those that balance sheepmeat and wool production (Sustainable Merino) and those with a strong focus on sheepmeat production (Merino Lamb) (MLA 2024). Given the current high MPs for fine wool, incorporating the current FD price relationships into the suite of MERINOSELECT industry indexes would place a higher relative emphasis on reducing FD. As FD is a highly heritable trait, the net effect would approach single trait selection for FD regardless of the emphasis placed on other traits in any of the MERINOSELECT indexes. This would limit genetic gain in other traits that make an economic contribution to each index. As genetic trends across the MERINOSELECT database indicate most Merino breeders have historically placed a high emphasis on increasing FW while maintaining FD (Swan *et al*. 2017), the MERINOSELECT indexes are adjusted to express a reduced MP as with historic indexes, 50% for Fine Wool and 40% for Wool Production (Figure 3) compared to the prices paid for FD.

CONCLUSION

The development of industry selection indexes is extremely challenging in the current market environment with emphasis on an increased range of wool, meat and reproduction traits plus the desire to include welfare traits. While the latter often have little to no market value, they are included

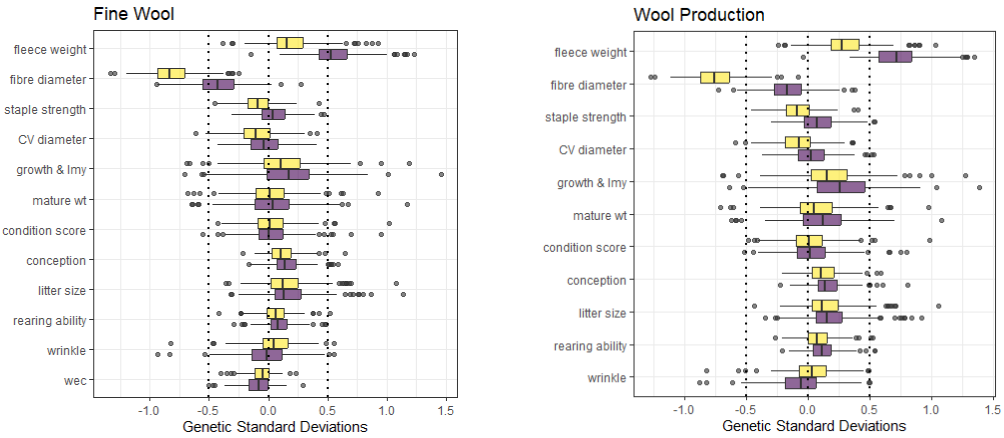

Figure 3. Range in relative selection advantages (superiority of top 10% to average) realised from selection on the current index (purple) or when full MP realised within the same index (yellow) for the Fine Wool and Wool Production indexes across MERINOSELECT member flocks in their 2023 drop progeny.

as indicators in the Sheep Sustainability Framework and the Australian Wool Sustainability Scheme. The genetic relationships, often unfavourable, between traits adds to the challenge. Variation in flock structure, current production level of individual flocks and genetic relationships between traits within a flock means the relative economic value of traits in MERINOSELECT indexes is a sound starting point but not a perfect fit for every Merino enterprise. As the emphasis on FD in MERINOSELECT indexes does not reflect the high MPs for fine wool, individual Merino breeders require easy access to MPs and the relative FD emphasis in MERINOSELECT indexes to make informed decisions on the index they choose to use on genetic gain in FD and the need to apply independent emphasis on traits to make progress towards their flock's breeding objective. Simple response predictions tools that allow the impact of changing trait weightings are required to make it straightforward to assess the impact of changing trait weightings, in particular MPs.

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