

## Short communication

# A farm-scale evaluation of the influence of hedgerow cutting frequency on hawthorn (*Crataegus monogyna*) berry yields

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**Abstract**

Hawthorn *Crataegus monogyna* is the dominant hedgerow species in the UK and has the potential to produce an abundance of berries (haws). These berries provide an important food resource for many animals through the winter. Experimental studies have shown a strong influence of hedgerow management on berry production and this study examines whether that influence extends to farm-scale hedgerow management. Hawthorn berries were harvested from hedgerows that had been subject to three different cutting frequencies at each of three farmland sites in the UK. Analysis showed that the yield of berries per unit area of hedgerow was significantly different between treatments in all cases; with the yield from uncut hedges exceeding annually cut hedges by a factor of 50.

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**1. Introduction**

The removal of hedges that led to the loss of approximately half of Britain's hedgerows during the last century (Barr and Parr, 1994) seems to have ceased. The current stock, which stands at approximately 450,000 km, showed no significant decline between 1990 and 1998, (Haines-Young et al., 2000). However, during the same period, there was a decline in the length of remnant hedges of 21%, equivalent to 14,000 km (Haines-Young et al., 2000). Hawthorn *Crataegus monogyna* Jacq. is the dominant shrub species in British hedgerows (Cummins and French, 1994) especially in the post-enclosure hedges (Pollard et al., 1974). Being the dominant linear feature in

the landscape, hedges have an important function as wildlife habitat in farmland.

Hedgerow berries provide a winter food resource for many species including small mammals and birds (Lang, 1987). Hawthorn berries form an important dietary component of *Turdus* spp. especially blackbirds *T. merula* L., fieldfares *T. pilaris* L. and redwings *T. iliacus* L. (Snow and Snow, 1988). Although the nutritional value of hawthorn berries is not outstanding in terms of energy per gram of fruit (Snow and Snow, 1988), the dominance of hawthorn in the hedgerow, and the abundance of the yield, makes them a significant contributor to the available food resource.

As the management of hedges determines berry production so the targeting of hedge cutting practice to the ecology of hawthorn could influence the value of hedgerows as a winter food resource (Hinsley and Bellamy, 2000). Although berry production and the impact of management have been examined in

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Table 1

Mean ( $\pm$ S.E.) fresh berry yields (g per 2.5 m<sup>2</sup>) and percentage dry matter content ( $\pm$ S.E.) for three cutting frequencies

| Treatment       | Yorkshire    |                | Cambridgeshire |                | Buckinghamshire |                | Mean         |                |
|-----------------|--------------|----------------|----------------|----------------|-----------------|----------------|--------------|----------------|
|                 | Yield        | Dry matter     | Yield          | Dry matter     | Yield           | Dry matter     | Yield        | Dry matter     |
| Annual cut      | 4 $\pm$ 3    | 34.8 $\pm$ 0.3 | 10 $\pm$ 3     | 41.4 $\pm$ 2.2 | 11 $\pm$ 5      | 39.4 $\pm$ 1.2 | 8 $\pm$ 2    | 38.5 $\pm$ 2.0 |
| Medium term     | 175 $\pm$ 88 | 34.1 $\pm$ 1.6 | 143 $\pm$ 15   | 41.3 $\pm$ 1.9 | 173 $\pm$ 77    | 43.5 $\pm$ 2.5 | 164 $\pm$ 11 | 39.6 $\pm$ 2.8 |
| Long term/uncut | 305 $\pm$ 65 | 36.0 $\pm$ 1.5 | 393 $\pm$ 57   | 41.9 $\pm$ 1.1 | 530 $\pm$ 36    | 39.4 $\pm$ 0.2 | 410 $\pm$ 65 | 39.1 $\pm$ 1.7 |
| Significance    | 0.009        | ns             | 0.002          | ns             | 0.009           | ns             | <0.001       | ns             |

ns:  $P > 0.05$ . Figures for individual sites are based on five replicates.

relatively short (12–20 m) hedgerow plots under controlled field experiments (Sparks and Martin, 1999; Maudsley et al., 2000; Sparks et al., 2000) berry yields have not been investigated under typical farmland management. This paper rectifies this situation by reporting the influence of cutting frequency on hawthorn berry yields at three farmland sites in the UK.

## 2. Materials and methods

Three farmland sites were selected, Manor Farm, Eddlethorpe, Yorkshire SE7766, Grange Farm, Knapwell, Cambridgeshire TL3363 and Marsh Gibbon, Buckinghamshire SP6523. The first two were arable farms and the latter mixed farmland belonging to several farms. At each site hedges were identified that had been subjected to three different cutting regimes, i.e. (1) hedges cut within the past year, (2) hedges managed but uncut for at least 2 years, (3) hedges uncut for many years. As records for more accurate assessment of cutting frequency did not exist these categories were determined by local knowledge and confirmed by visual assessment. At each site five hedges of each treatment (cutting frequency) were selected. Berries were harvested from 10 50 cm  $\times$  50 cm quadrats placed against one side of the hedge face, approximately 1 m above ground level. In hedges entirely of hawthorn the quadrats were spaced at 10 m intervals while in mixed hedgerows the berries from the next nearest hawthorn to 10 m were harvested.

The berries were weighed fresh then oven dried at 80 °C for 24 h. The berries were then re-weighed to determine the dry matter content. Berry harvesting was carried out between 25 September and 26 October 2001.

The data for individual sites were subsequently analysed using Kruskal–Wallis tests. The mean yield data of the three treatments for all sites were subject to log transformation to stabilise the variance and then examined by two-way ANOVA (factors site and treatment) with Tukey's HSD test used to identify significantly different groups. Over-sites analysis of dry matter content used ANOVA on untransformed data.

## 3. Results

The results are summarised in Table 1. The analysis showed significant differences in the fresh weight of berries between treatments at all sites. Furthermore, the results from the over-sites analysis showed significant differences between all three treatments in berry yield. There was no significant difference between treatments in the percentage dry matter content.

## 4. Discussion

The results clearly confirm that hedgerow management plays an important role in hawthorn berry production. The low berry weight on hedges cut within the past year was to be expected as the flowering, and subsequent fruit-set occurs on 2-year-old wood. This demonstrates that the annual trimming of farm hedges can have a detrimental effect on the availability of winter food resources for small mammals and birds. Small, closely cut hedges, which are generally the norm in arable areas, provide fewer opportunities for shelter and nest sites although they are preferentially used for nesting by some species such as

the corn bunting *Miliaria calandra* L. (Sparks et al., 1996). The hedges that were managed regularly but where cutting had not occurred for at least 2 years not only provided significantly more berries but also provided better shelter and nest sites while retaining a “tidy” appearance and remaining stockproof. The lack of precise cutting dates prevented the identification of differences in yield between autumn and spring cut hedges that were shown by Maudsley et al. (2000). The hedges that were uncut for many years were quite varied, some retaining a good hedge structure while others had become gappy and were more properly described as remnant hedges. However this lack of management clearly provided the most food resource.

The method used did not take into account the different height of hedges surveyed and thus is a conservative estimate of the relative value of treatments. Hedges that were cut annually had less surface area per unit length than either those cut at least 2 years previously or those uncut for many years. The 50-fold difference in yields between annually cut and uncut hedges is likely to be extended to a 150-fold difference when increased surface area of uncut hedges is taken into account.

This study used hedges on working farms and there was no exclusion of birds from any of the hedges so some berries may already have been removed. However, the consistency of the results at all three sites and across all treatments, suggests that the berry crop had not yet been utilised by wildlife during the mild autumn of 2001.

Cutting hedges on a 3-year cycle would have many benefits. It is frequent enough to maintain a well-managed appearance, is cost effective, growth would be of small enough diameter to be handled by tractor-mounted flails, and reduced cutting frequency would greatly enhance the value as wildlife habitat. On farms where it is deemed essential to continue cutting on an annual basis, consideration could be given to leaving a short length at hedgerow junctions and corners uncut, or cut on a longer cycle. There are further opportunities for leaving hedges uncut, without interfering with farming operations, which would include woodland edges, and around farmyards and outbuildings. These areas could provide

“berry islands” and a greater abundance of winter food resource than the total from annually cut hedges.

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## References

- Barr, C.J., Parr, T.W., 1994. Hedgerows: linking ecological research and countryside policy. In: Watt, T.A., Buckley, G.P. (Eds.), *Hedgerow Management and Nature Conservation*. Wye College Press, Wye, pp. 119–136.
- Cummins, R.P., French, D.D., 1994. Floristic diversity, management and associated land use in British hedgerows. In: Watt, T.A., Buckley, G.P. (Eds.), *Hedgerow Management and Nature Conservation*. Wye College Press, Wye, pp. 95–106.
- Haines-Young, R.H., Barr, C.J., Black, H.I.J., Briggs, D.J., Bunce, D.J., Clarke, R.T., Cooper, A., Dawson, F.H., Firbank, L.G., Fuller, R.M., Furze, M.T., Gillespie, M.K., Hill, R., Horning, M., Howard, D.C., McCann, T., Morecroft, M.D., Petit, S., Sier, A.R.J., Smart, S.M., Smith, G.M., Stott, A.P., Stuart, R.C., Watkins, J.W., 2000. *Accounting for Nature: Assessing Habitats in the UK Countryside*. DETR, London.
- Hinsley, S.A., Bellamy, P.E., 2000. The influence of hedge structure, management and landscape context on the value of hedgerows to birds: a review. *J. Environ. Manage.* 60, 33–49.
- Lang, D.C., 1987. *The Complete Book of British Berries*. Threshold Books, London.
- Maudsley, M.J., West, T.M., Rowcliffe, H.R., Marshall, E.J.P., 2000. The impact of hedge management on wildlife: preliminary results on plants and invertebrates. *Aspects Appl. Biol.* 58, 389–396.
- Pollard, E., Hooper, M.D., Moore, N.W., 1974. *Hedges*. Collins, London, 256 pp.
- Snow, B., Snow, D., 1988. *Birds and Berries*. Poyser, Carlton, 268 pp.
- Sparks, T.H., Martin, T., 1999. Yields of hawthorn *Crataegus monogyna* berries under different hedgerow management. *Agric., Ecosyst. Environ.* 72, 107–110.
- Sparks, T.H., Parish, T., Hinsley, S.A., 1996. Breeding birds in field boundaries in an agricultural landscape. *Agric., Ecosyst. Environ.* 60, 1–8.
- Sparks, T.H., Robinson, K.A., Downing, S.L., 2000. Hedgerow management and the yield of hawthorn *Crataegus monogyna* berries. *Aspects Appl. Biol.* 58, 421–424.