Efficacy and safety of topical administration of selamectin for treatment of ear mite infestation in rabbits

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Objective—To evaluate the efficacy and safety of topical administration of selamectin in rabbits naturally infested with *Psoroptes cuniculi*.

Design—Randomized controlled trial.

Animals—48 mixed-breed domestic rabbits with active *P cuniculi* mite populations and clinical ear lesions.

Procedures—Rabbits were randomly allocated to 1 of 6 treatment groups. On day 0, rabbits in groups 1 and 2 were given vehicle, rabbits in groups 3 and 4 were given selamectin at a dose of 6 mg/kg (2.7 mg/lb), and rabbits in groups 5 and 6 were given selamectin at a dose of 18 mg/kg (8.2 mg/lb). On day 28, rabbits in groups 2, 4, and 6 were given a second dose of vehicle or selamectin. Otoscopic examinations were performed and ear lesion size was measured weekly for 8 weeks. Quantitative viable mite counts were performed on day 56.

Results—On days 7 through 56, lesion sizes for all selamectin-treated groups were significantly lower than sizes for control groups; there were no significant differences in lesion sizes among selamectin-treated groups. All rabbits in the 2 control groups had viable adult *P cuniculi* mites for the duration of the study, as determined by otoscopic examination, whereas all rabbits in the 4 selamectin-treated groups were free from *P cuniculi* mites on days 7 through 56. No adverse reactions associated with selamectin treatment were observed.

Conclusions and Clinical Relevance—Results suggest that topical application of selamectin at a dose of 6 or 18 mg/kg can completely eliminate mites from rabbits naturally infested with *P cuniculi*. (J Am Vet Med Assoc 2003;223:322–324)
Rabbits were housed individually in wire cages (0.3 to 0.4 m² [3 to 4 ft²]) and grouped by treatment; no contact was permitted between treatment groups. Cages were housed in an enclosed barn equipped with forced air heat and natural ventilation. Commercial rabbit pellets (17% protein) and water were available ad libitum. Rabbits were not known to have had any prior treatment with an ectoparasiticide. Rabbits were selected on the basis of overall health and the presence of clinical ear lesions and active *P. cuniculi* mite populations, as determined by means of otoscopic examination.

**Experimental design**—Prior to inclusion in the study, rabbits were evaluated for severity of *P. cuniculi* infestation. Ear lesion size was recorded as the sum of the area of the lesions in each ear, measured to the nearest 0.25 cm². Rabbits were grouped according to lesion size and randomly allocated to 1 of 6 treatment groups (8 rabbits/group) so that each treatment group contained rabbits with a similar range of lesion severity.

Three days after assignment to the treatment groups (day 0), rabbits were treated topically with vehicle or selamectin. Rabbits in groups 1 and 2 were given vehicle at a dose of 0.1 mL/kg (0.045 mL/lb), 0.25 mL for rabbits weighing ≤ 2.5 kg (5.5 lb), 0.75 mL for rabbits weighing 2.6 to 7.5 kg (5.7 to 16.3 lb), and 1 mL for rabbits weighing > 7.5 kg. Rabbits in groups 3 and 4 were given selamectin at a dose of 2.5 μg/kg (2.7 μg/lb; 0.25 mL for rabbits weighing ≤ 2.5 kg, 2.25 mL for rabbits weighing 2.6 to 7.5 kg, and 3 mL for rabbits weighing > 7.5 kg). Rabbits in groups 5 and 6 were given selamectin at a dose of 18 mg/kg (8.2 mg/lb; 0.75 mL for rabbits weighing ≤ 2.5 kg, 2.25 mL for rabbits weighing 2.6 to 7.5 kg, and 3 mL for rabbits weighing > 7.5 kg). On day 28, rabbits in groups 2, 4, and 6 were reweighed and given a second dose of vehicle or selamectin. Selamectin or vehicle was applied directly to the skin at the base of the neck, cranial to the scapulae.

Treatments were supplied in plastic unit-dose tubes (0.25 or 0.75 mL of selamectin at a concentration of 60 mg/mL and 0.25 or 0.75 mL of vehicle). The vehicle consisted of isopropyl alcohol and glycol methyl ether.

The general health of all rabbits was monitored daily throughout the study, and detailed clinical observations were made approximately 4 and 24 hours after treatment on days 0 and 28.

Otoscopic examinations for viable adult *P. cuniculi* mites were performed on all rabbits on days 7, 14, 21, 28, 35, 42, 49, and 56. Ear lesion size was also determined for each rabbit on days 7, 14, 21, 28, 35, 42, 49, and 56. At the conclusion of the study (day 56 or 57), rabbits were euthanatized, and quantitative counts of viable *P. cuniculi* mites (larvae, nymphs, and adults) were performed on all rabbits.

### Results

Prior to the initial treatment (day –3), mean ear lesion size was not significantly different among groups (Table 1), and no significant differences in mean ear lesion size were observed between the 2 control groups (groups 1 and 2) at any time during the study. Mean ear lesion sizes for the selamectin-treated groups were significantly lower than lesion sizes for the corresponding control groups on days 7 through 56 after treatment. However, there were no significant differences in mean ear lesion size at any time among the 4 selamectin-treated groups.

All rabbits in the control groups had viable adult *P. cuniculi* mites for the duration of the study, as determined by otoscopic examination, whereas all rabbits in the 4 selamectin-treated groups were free from *P. cuniculi* mites on days 7 through 56. Geometric mean live mite counts, determined at the end of the study, were not significantly different between the 2 control groups (geometric mean live mite counts for groups 1 and 2 were not significantly different). Mean ear lesion sizes for all selamectin-treated groups were significantly lower than lesion sizes for the corresponding control groups on days 7 through 56.

### Statistical analyses

Data for ear mite counts (representing the number of mites in both ears) were analyzed with a general linear mixed model. If a significant treatment effect was found, appropriate contrasts among treatments on each day of the study were performed. Mite counts were transformed to natural logarithms prior to analysis, and least-squares means were back-transformed to geometric means for tabular presentation.

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### Table 1—Size of ear lesions in rabbits naturally infested with *Psoroptes cuniculi* and treated topically with vehicle or selamectin

<table>
<thead>
<tr>
<th>Group</th>
<th>Day –3</th>
<th>Day 7</th>
<th>Day 14</th>
<th>Day 21</th>
<th>Day 28</th>
<th>Day 35</th>
<th>Day 42</th>
<th>Day 49</th>
<th>Day 56</th>
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<tbody>
<tr>
<td>1</td>
<td>6.4</td>
<td>7.2</td>
<td>7.4</td>
<td>8.3</td>
<td>8.1</td>
<td>9.2</td>
<td>8.8</td>
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<td>9.4</td>
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<td>2</td>
<td>6.4</td>
<td>7.2</td>
<td>7.4</td>
<td>8.3</td>
<td>8.1</td>
<td>9.2</td>
<td>8.8</td>
<td>9.7</td>
<td>9.4</td>
</tr>
<tr>
<td>3</td>
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<td>1.7</td>
<td>0.5</td>
<td>0.2</td>
<td>0.4</td>
<td>0.3</td>
<td>0.5</td>
<td>0.2</td>
<td>0.1</td>
</tr>
<tr>
<td>4</td>
<td>5.7</td>
<td>1.1</td>
<td>0.6</td>
<td>0.4</td>
<td>0.7</td>
<td>1.0</td>
<td>0.9</td>
<td>0.2</td>
<td>0.1</td>
</tr>
<tr>
<td>5</td>
<td>9.0</td>
<td>2.0</td>
<td>0.6</td>
<td>0.2</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>6</td>
<td>6.0</td>
<td>1.0</td>
<td>0.5</td>
<td>0.7</td>
<td>0.1</td>
<td>0.1</td>
<td>0.2</td>
<td>0.1</td>
<td>0.1</td>
</tr>
</tbody>
</table>

On day 0, rabbits in groups 1 and 2 were given vehicle, rabbits in groups 3 and 4 were given selamectin at a dose of 6 mg/kg (2.7 mg/lb), and rabbits in groups 5 and 6 were given selamectin at a dose of 18 mg/kg (8.2 mg/lb). On day 28, rabbits in groups 2, 4, and 6 were given a second dose of vehicle or selamectin. On days 7 through 56, mean ear lesion sizes for all selamectin-treated groups were significantly lower (P ≤ 0.05) than sizes for control groups; there were no significant differences in mean lesion sizes among selamectin-treated groups.
were 2,033 and 2,029, respectively). No live mites were recovered from any selamectin-treated rabbits; therefore, for all 4 selamectin-treated groups, geometric mean live mite counts were 0, and mean percentage reductions in mite counts were 100%. Mean live mite counts were significantly lower for the selamectin-treated groups than for the corresponding control groups.

No adverse clinical signs associated with treatments were observed during the study.

Discussion
Results of the present study suggest that a single topical application of selamectin at a dose of 6 or 18 mg/kg can completely eliminate mites from rabbits naturally infested with \textit{P cuniculi}. In the present study, no live ear mites were recovered from any selamectin-treated rabbits, whereas all control rabbits remained heavily infested with viable \textit{P cuniculi} mites. The substantial decrease in mean ear lesion size 7 days after treatment for the 4 selamectin-treated groups was particularly remarkable, considering the size of the lesions and amount of scabbing in some of the more heavily infested rabbits prior to treatment.

Although detailed toxicity studies in rabbits have not been reported, selamectin has been shown to be safe in dogs and cats.\textsuperscript{19,20} In the present study, although additional treatments were not necessary for elimination of mites, 1 or 2 topical applications of selamectin at a minimum dose of 6 mg/kg and 1 or 2 topical applications of selamectin at a minimum dose of 18 mg/kg with a 28-day interval between treatments did not result in any adverse clinical signs. Selamectin is not currently approved for use in rabbits in the United States or elsewhere in the world.

\textsuperscript{Revolution\textregistered\texttrademark Stronghold, Pfizer Animal Health, New York, NY.}

References